Z.ONE *Ultra*

Z.ONE *Ultra* ULTRASOUND SYSTEM

(4.X Release)

SERVICE MANUAL

BREAK THROUGH THE SOUND BARRIER

ZONARE

REVISION HISTORY		
REV	**DESCRIPTION**	**DATE**
A	Initial Release to support Version 4.0 Software/Hardware	1/09
B	Updated software release and Scan Module support	4/09
C	Updated to 4.1/4.2 software releases	9/09
D	Updated Release to Support 4.7 SW & Product Changes	7/11

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

TABLE OF CONTENTS

1 INTRODUCTION 10

1.1 Purpose 11

1.2 Product Overview 11

1.3 Product Features 12

1.4 Definitions/Acronyms 13

1.5 Documentation Conventions 15

2 SAFETY 17

2.1 CAUTIONs and WARNINGs During Service/Operation 17

2.2 Battery WARNINGs 18

2.3 CAUTIONs During Service 18

2.4 Battery CAUTIONs 19

2.5 USB Memory Stick CAUTIONs 19

2.6 Networking CAUTION 19

3 SYSTEM SPECIFICATIONS 20

3.1 System Dimensions 20

3.2 Displays 21

3.3 Image Archive or Export Storage 22

3.4 Transducers 22

3.5 Accessories/Options 26

3.6 Peripherals 26

3.7 Site Requirements 26

3.8 System Power 27

3.9 System Power Protection 27

3.10 Electrical Specifications 27

3.11 Temperature, Humidity, Pressure Limits 29

3.12 Device Classification 30

3.13 Safety Standards 30

3.14 DICOM Standard 30

3.15 Product Labeling 30

4 TOP-LEVEL PRODUCT OVERVIEW 35

4.1 Major Assembly Identification 35

4.2 Transducers 35

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4.3 Accessory Components 36
4.4 SmartCart Major Assemblies *(shown with MTP Multi- probe Option)* 37
4.5 miniCart Major Assemblies 38
4.6 SmartCart User Interface Controls (Overview) 39
4.7 Scan Engine User Interface Controls (Overview) 41
4.8 SmartCart User Interface Controls (Detailed) – Version 1 42
4.9 SmartCart User Interface Controls (Detailed) – *"Enhanced" Version* (2) 47
4.10 SmartCart & *mini*Cart Keyboard Controls (Detailed) 52
4.11 Scan Engine User Interface Controls (Detailed) 55
4.12 SmartCart Rear I/O Panel: Layout & Functional Definitions 58
4.13 *mini*Cart I/O Connections: Layout & Functional Definitions 58
4.14 Scan Engine/Scan Module Rear I/O Ports: Layout & Functional Definitions 59
4.15 AVED: Audio-Video Extension Device - I/O Panel: *(Option)* 59

5 SYSTEM UNCRATING & INSTALLATION PROCEDURES 61
5.1 Product Shipment 61
5.2 Electrical Requirements 61
5.3 Environmental and Space Requirements 61
5.4 Uncrating 61
5.5 Mechanical Verification 65
5.6 System Installation: 65
5.7 Transporting - Shipping the Scan Engine/Scan Module 74

6 BASIC SYSTEM CONFIGURATION 75
6.1 Basic System Configuration Procedures 75

7 ARCHIVE MENU FUNCTIONS 83
7.1 "Media" & "Store/Print" Button Configuration 83
7.2 "Exam Export" Menu 86
7.3 "Exam Management" Menu 87
7.4 Archive "Export" – OPTION menu 93
7.5 "Serial Port" Setup - (Export Calc Report Data) 95

8 DICOM CONFIGURATION 98
8.1 "DICOM" Configuration Overview 98
8.2 "DICOM" Configuration Parameter Definitions: 99
8.3 Z.ONE*Ultra* Pre-Install Survey Form *(Sample Only)* 102

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

8.4 “DICOM” Configuration Procedure - Menus 106
8.5 “Network” Setup 114
8.6 “FTP” Setup 116

9 ADVANCED SYSTEM SETUP CONFIGURATION 118
9.1 “Security” Setup Menus 118
9.2 “Power Save” Setup Menu 120

10 GENERAL PROCEDURES 122
10.1 Installing USB Memory Stick, into the Scan Engine/Scan Module 122

11 FUNCTIONAL DESCRIPTIONS 123
11.1 Overall System 123
11.2 SmartCart 125

12 POWER & SIGNAL DISTRIBUTION DIAGRAMS 129
12.1 SmartCart Power Module Block Diagram (Basic) 130
12.2 SmartCart Power Module Block Diagram (Detailed) 131
12.3 SmartCart Main Board Cable Connect Diagram (Original DVD Config) 132
12.4 SmartCart Main Board Cable Connect Diagram (IDE/SATA Adapter DVD Config) 133
12.5 SmartCart Main Board Cable Connection Diagram (USB Style DVD Configuration) 134
12.6 *mini*Cart AC/DC Power Distribution Diagram 135

13 FUNCTIONAL BLOCK DIAGRAMS 136
13.1 Z.ONE*Ultra* Overall System Block Diagram (SmartCart w/Cardiac-Option Configuration) 137
13.2 miniCart Configuration: Overall System Block Diagram 138
13.3 Z.ONE*Ultra* SmartCart - *Cardiac Module (CW/ECG) Option - Block* Diagram 139

14 ASSEMBLY DIAGRAMS 140
14.1 SmartCart: Power Module Functional Identification 140

15 PERIPHERALS & ACCESSORIES 141
15.1 DVD/CD Burner - *(Internal)*" 141
15.2 AVED – Audio Video Extension Device Box - *(Option)*" 142
15.3 SONY UP-D897 USB Digital Printer 148
15.4 SONY UP-D25MD Color Printer 154
15.5 HP LaserJet Network (REPORT) Printer 156
15.6 2- Pedal Footswitch 160

16 SOFTWARE PROCEDURES 161

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

16.1 SCAN ENGINE: Standard Software Installation/Upgrade Procedure 161
16.2 SCAN ENGINE (Only) "Ad*vanced"* Software Installation Procedure 163
16.3 SCAN MODULE: Standard Software Installation/Upgrade Procedure 167
16.4 SCAN MODULE: "Clean" Software Install Procedure ("SERVICE" key) 169
16.5 SCAN MODULE: "Clean" Software Install Procedure (Undocked or Auto-Load) 170
16.6 FTP Site Access: Software/File Downloads from Zonare 172
16.7 "DIAGNOSTIC" Panel Operations 172

17 CLEANING AND DISINFECTING PROCEDURES 183
17.1 SmartCart 183
17.2 Scan Engine 184
17.3 Transducers 185

18 MAINTENANCE – CALIBRATION PROCEDURES 189
18.1 Foreword 189
18.2 List: Maintenance Procedures 189
18.3 List: Calibration Procedures 189
18.4 PIC Reset (Power Supply) Procedure 190
18.5 Z-PAK "RECONDITION" Procedure - (SmartCart) 190
18.6 UI Lift (Gas spring) Release Cable Adjustment - (SmartCart) 192
18.7 Touchscreen Calibration - (Scan Engine) 193
18.8 Display Monitor Adjustment – User Settings 195

19 SYSTEM TROUBLESHOOTING 197
19.1 Foreword 197
19.2 Technical Support Contact Information 197
19.3 Troubleshooting 199
19.4 System Status LED & Error Code Definitions 206
19.5 Scan Engine Fan Operation 214
19.6 SmartCart LCD Display Troubleshooting 214
19.7 Battery Performance – Charge Times - Reconditioning 215

20 REPAIR PROCEDURES 217
20.1 Foreword 217
20.2 Recommended Tools 217
20.3 Hardware Service/Replacement Procedures (SmartCart) 217
20.4 Hardware Service/Replacement Procedures (*mini*Cart) 277

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

20.5 Hardware Service/Replacement Procedures (Scan Engine) 287
20.6 Hardware Service/Replacement Procedures (Transducers) 288
20.7 Service Software Procedures 291

21 PART NUMBER INFORMATION 293
21.1 SmartCart 293
21.2 *mini*Cart 296
21.3 Scan Engine 298
21.4 Scan Module 299
21.5 Transducers 300
21.6 Peripherals 302

22 INDEX 303

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

TABLE OF FIGURES

FIGURE 1: LABEL, SCAN ENGINE – SERIAL/PART NO. 31
FIGURE 2: LABEL, SCAN MODULE – SERIAL/PART NO. 31
FIGURE 3: LABEL, SCAN ENGINE BATTERY (VERSION 1) - SERIAL/PART NO. 31
FIGURE 4: LABEL, SCAN ENGINE BATTERY (VERSION 2) - SERIAL/PART NO. 31
FIGURE 5: LABEL, 100V-240V SMARTCART REAR PANEL - SERIAL/PART NO. 32
FIGURE 6: LABEL, SMARTCART Z-PAK BATTERY 32
FIGURE 7: LABEL, *MINI*CART REAR PANEL - SERIAL/PART NO. 32
FIGURE 8: LABEL, LINEAR ARRAY TRANSDUCERS - SERIAL/PART NO. 33
FIGURE 9: LABEL, CURVED ARRAY TRANSDUCERS - SERIAL/PART NO. 33
FIGURE 10: LABEL, ENDO CAVITY TRANSDUCER - SERIAL/PART NO. 33
FIGURE 11: LABEL, PHASED TRANSDUCERS - SERIAL/PART NO. 33
FIGURE 12: LABEL, SPECIALTY TRANSDUCERS - SERIAL/PART NO. 33
FIGURE 13: LABEL, AC POWER BATTERY ADAPTER 34
FIGURE 14: LABEL, AC POWER ADAPTER POWER SUPPLY 34
FIGURE 15: Z.ONE*ULTRA* MAJOR ASSEMBLY ILLUSTRATIONS 35
FIGURE 16: TRANSDUCER ILLUSTRATIONS 35
FIGURE 17: ACCESSORIES 36
FIGURE 18: SMARTCART KEYBOARD CONTROLS (OVERVIEW) 39
FIGURE 19: SMARTCART USER INTERFACE (VERSION 1) CONTROLS (OVERVIEW) 39
FIGURE 20: SMARTCART USER INTERFACE ("ENHANCED" VERSION) CONTROLS (OVERVIEW) 40
FIGURE 21: SCAN ENGINE USER INTERFACE CONTROLS (OVERVIEW) 41
FIGURE 22: SMARTCART USER INTERFACE LAYOUT – VERSION 1 42
FIGURE 23: SMARTCART USER INTERFACE LAYOUT – "ENHANCED" VERSION (2) 47
FIGURE 24: SMARTCART KEYBOARD LAYOUT 52
FIGURE 25: *MINI*CART KEYBOARD LAYOUT 52
FIGURE 26: SCAN ENGINE USER INTERFACE LAYOUT (DETAILED) 55
FIGURE 27: SMARTCART REAR I/O PANEL 58
FIGURE 28: *MINI*CART USB HUB CONNECTIONS 58
FIGURE 29: SCAN ENGINE/SCAN MODULE REAR I/O CONNECTIONS 59
FIGURE 30: AVED OPTION - I/O PANEL (SMARTCART) 59
FIGURE 31: MAIN SHIPPING CONTAINER REMOVAL 62
FIGURE 32: LOADING RAMP LOWERING 62
FIGURE 33: REMOVABLE SECTION OF SHIPPING BASE 62
FIGURE 34: REMOVING PROTECTIVE STORAGE BAG 63
FIGURE 35: BRAKE RELEASE OF WHEELS 63
FIGURE 36: BATTERY PACK INSTALLATION 66
FIGURE 37: SCANNER DOCKING IN SMARTCART 66
FIGURE 38: SCAN ENGINE TO *MINI*CART DOCKING 67
FIGURE 39: AC POWER ADAPTER 70
FIGURE 40: 2-BAY BATTERY CHARGER 72
FIGURE 41: INSTALLING USB MEMORY STICK 122
FIGURE 42: SMARTCART: BRAKE MECHANISM 127
FIGURE 43: SMARTCART: HEIGHT ADJUSTMENT MECHANISM 128
FIGURE 44: SMARTCART: POWER MODULE BLOCK DIAGRAM (BASIC) 130
FIGURE 45: SMARTCART: POWER MODULE BLOCK DIAGRAM (DETAILED) 131
FIGURE 46: SMARTCART: MAIN BOARD CABLE CONNECTION DIAGRAMS (ORIGINAL DVD) 132
FIGURE 47: SMARTCART: MAIN BOARD CABLE CONNECTION DIAGRAMS (IDE/USB ADAPTER STYLE DVD) 133
FIGURE 48: SMARTCART: MAIN BOARD CABLE CONNECTION DIAGRAMS (USB STYLE DVD DRIVE) 134
FIGURE 49: *MINI*CART: AC/DC POWER DISTRIBUTION DIAGRAM 135
FIGURE 50: OVERALL SYSTEM BLOCK DIAGRAM (ADVHDWE SCAN ENGINE & SMARTCART W/CARDIAC OPTION) 137
FIGURE 51: OVERALL SYSTEM BLOCK DIAGRAM (ADVHDWE SCAN ENGINE & *MINI*CART) 138
FIGURE 52: SMARTCART: CARDIAC OPTION (CW/ECG) MODULE BLOCK DIAGRAM 139

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

FIGURE 53: SMARTCART: POWER MODULE FUNCTIONS DIAGRAM 140
FIGURE 54: AVED: AUDIO VIDEO EXTENSION DEVICE I/O PANEL DIAGRAM 144
FIGURE 55: MENU SETTINGS (UP-D897) 150
FIGURE 56: OPERATOR CONTROLS (UP-D897) 152
FIGURE 57: APPROVED DISINFECTANTS TABLE (IMMERSION-METHOD) 185
FIGURE 58: APPROVED DISINFECTANTS TABLE (WIPE-METHOD) 186
FIGURE 59: TRANSDUCER IMMERSION LIMITS 187
FIGURE 60: *MINI*CART 13" DISPLAY: RECOMMENDED SETTINGS - 195
FIGURE 61: SMARTCART 19" DISPLAY: RECOMMENDED SETTINGS 195
FIGURE 62: TRANSDUCER CONNECTOR PIN DAMAGE – (EXAMPLE) 199

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- **USA, Canada, Asia**

ZONARE Medical Systems, Inc.

420 N. Bernardo

Mountain View, CA 94043

Toll-free line (***in USA only***) live-voice support: 1-877-913-9663

Standard line (USA & International) live-voice support: 1-650-316-3199

Tech Support fax line 1-650-230-2817

Customer Support E-Mail: ..... techsupport@zonare.com or salessupport@zonare.com

Web site ..... www.zonare.com

FTP site (Service) ftp://12.40.200.87

Toll-free live-phone support: ..... **1-877-913-9663** (5:00AM – 5:00PM, Pacific Standard Time)

Tech Support FAX line **1-650-230-2817**

Tech Support e-mail ..... **techsupport@zonare.com**

Corporate web site ..... **www.zonare.com**

FTP site (Tech Support Window):

- URL **ftp://12.40.200.87**
- Enter the following User Name and Password information:

User Name: (call Tech Support for current login information)

Password: (call Tech Support for current login information)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- **Europe**

ZONARE Medical Systems GmbH

Henkestrasse 91

91052 Erlangen, Germany

Tech Support Phone ..... **(+49) 9131-974 94-0** (8:00AM – 5:00PM)

Tech Support e-mail ..... **info@zonare.de**

Corporate web site..... **www.zonare.com**

1.1 Purpose

This manual's purpose is to provide information to assist service personnel in performing the service, maintenance, and repair procedures that may be required to support ZONARE's Z.ONE*Ultra* Diagnostic Ultrasound System product.

1.2 Product Overview

ZONARE's Z.ONE*Ultra* Convertible Ultrasound System provides a combination of a full-featured, cart-based ultrasound system, with the versatility of a compact, easily transportable to the patient, self-contained portable unit.

The Z.ONE*Ultra* Convertible Ultrasound System is offered in two different models, utilizing two different configurations of Carts. The sub-systems that comprise the Z.ONE*Ultra* product are listed below:

- Full-Feature **SmartCart** or lightweight ***mini*Cart**
- Portable "**Scan Engine**" (or docked "**Scan Module**"
- Ultrasound transducer(s)

The portable **Scan Engine** consists of a limited number of field replaceable units (FRU's). The FRU's for this unit are:

- Lithium-Ion battery pack
- USB Memory Stick
- Scan Engine (complete)

The **SmartCart** consists of a limited number of field replaceable units (FRU's). The FRU's for this unit are:

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- 19” Display Monitor
- User Interface Assembly
- OLED Sub-Assembly (part of UI)
- Main Board Assembly
- Power Supply Module
- Z-PAK Battery Pack
- Scanner Deck (w/MTP)
- MTP Bolster Plate (or MTP w/CW)
- ECG Module
- Misc cables and mechanical assemblies

The ***mini*Cart** consists of a limited number of field replaceable units (FRU’s). The FRU’s for this unit are:

- AC Fuses
- Main Power Supply (DC)
- USB Hub
- LCD Display
- Remote Keyboard
- Wheels

In addition to the two different Cart offerings, the Z.ONE*Ultra* Ultrasound System is offered with two different configurations of scanner electronics.

One version being a standalone portable use “**Scan Engine**” (with local LCD display and user interface controls), and the other being a “brains only” (non-portable) “**Scan Module”**.

Scan Engine

Scan Module

The ultrasound transducers are replaced as a single FRU, with no field-serviceable parts.

1.3 Product Features

The Z.ONE*Ultra* ultrasound system includes the following key features:

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- Full function scanning modalities (B-Scan, M-Mode, Color Flow, Power Doppler, PW Dopper)
- Remote portability for patient scanning

1.4 Definitions/Acronyms

2D: ..... Two dimensional (B-Mode, Color mode)

BMP: ..... **B**it **M**a**P**

C: ..... **C**olor Flow Mode (Doppler)

D: ..... Doppler (Pulsed Wave) Mode

DICOM: ..... **D**igital **I**maging and **CO**mmunication in **M**edicine

DSP:..... **D**igital **S**ignal **P**rocessing

ESD:..... **E**lectro **S**tatic **D**ischarge

EV:..... **E**ndo **V**aginal

FPGA: ..... **F**ield **P**rogrammable **G**ate **A**rray

FRU: ..... **F**ield **R**eplaceable **U**nit

HSSL: ..... **H**igh **S**peed **S**erial **L**ink

LCD:..... **L**iquid **C**rystal **D**isplay

LED: ..... **L**ight **E**mitting **D**iode

M:..... **M**-Mode (Motion Mode - Tissue)

NTSC:..... **N**ational **T**elevision **S**tandards **C**ommittee (video standard)

PAL: ..... **P**hase **A**lternation by **L**ine (video standard)

PRF:..... **P**ulse **R**epetition **F**requency

PW:..... **P**ulsed **W**ave Mode (Doppler)

Retrospective:.. Post-processing performed on frozen images from memory

SVGA: ..... **S**uper **V**ideo **G**raphics **A**rray

DGC: ..... **D**epth **G**ain **C**ompensation

USB:..... **U**niversal **S**erial **B**us

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

VKB:..... **V**irtual **K**ey**B**oard

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

1.5 Documentation Conventions

This following alert conventions are used in this manual:

1.5.1 Alert Messages

1. A **WARNING** indicates that **PERSONAL INJURY OR DEATH** may occur to patient and/or user if the user does not observe the provided information.

WARNING

2. A **CAUTION** indicates that **DAMAGE TO EQUIPMENT** may occur if the user does not observe the provided information.

CAUTION

3. A **PRECAUTION** indicates that **INCONVENIENCE TO THE USER** (such as loss of text entries or saved settings) may result if the user does not observe the provided information.

PRECAUTION

4. Common terms that have a special meaning for the Z.ONE*Ultra* (*e.g.* **Menu Control** or Trackball) are capitalized to distinguish their special usage (as opposed to a person who does navigation).

5. Control and function names (*e.g.* Print Button, Image Display) are capitalized for recognition.

6. Items to be acted upon are underlined (e.g. press the Store Button). Items needing emphasis are in boldface type.

1.5.2 Symbols

The following symbol conventions are used in this manual, and/or on the Z.ONE*Ultra* product:

This symbol is used to draw attention to information that may relate to safety of the patient, the operator, or the equipment.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Caution: ESD sensitive

This symbol indicates that the equipment <u>is not</u> Category AP, and therefore must not be used in the presence of flammable liquids or gasses.

.

Type BF patient applied part (B= body, F= floating applied part).

This symbol indicates that the equipment does not utilize a floating double insulated isolation connection, and therefore must not be connected to external equipment that is not protectively earthed (DO NOT connect to class II equipment).

Storage/Operating Temperature conditions

Alternating Current (AC)

Direct Current (DC)

Date of manufacture

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

2 SAFETY

It is extremely important to read the following definitions of WARNING information, prior to beginning any service on any sub-system within the Z.ONE*Ultra* product. As you see applicability of each of these noted WARNINGs, during the course of the servicing process, be prepared to avoid harm to persons and equipment by proper adherence.

2.1 CAUTIONs and WARNINGs During Service/Operation

CAUTION

*On the **miniCart**, to prevent possible damage to the 13" display monitor during system transport (or moving for relocation within the facility) the monitor should first be folded down to horizontal, rotated to a center position, and "locked" into place using the provided retaining pin located on the bottom of the display arm.*

CAUTION

To prevent possible damage to the electronics of the system from condensation, the following warning must be observed:

Anytime that any Zonare equipment (Scan Engine, SmartCart or minCart) is being moved from an environment that differs greatly in temperature and/or humidity, from the environment where it has been moved for intended operation, (as a result of shipping or transport) the unit should be allowed to stand for a period of no less than 30 minutes, prior to inserting battery or powering on.

WARNING

*Inspect all cables and power cords **BEFORE** powering-on the* Z.ONE*Ultra system; or connecting the transducer. Do not use the system if visual signs of external damage are observed.*

WARNING

To achieve proper grounding reliability, the Z.ONE*Ultra SmartCart or miniCart power plug must be fully inserted into a receptacle marked 'Hospital Grade". Do not remove the grounding wire. If there is any question of power outlet or power cord integrity, do not proceed. Obtain qualified technical assistance.*

WARNING

The ZONARE Z.ONE*Ultra contains no operator-serviceable components within the enclosures. To avoid electrical shock, the no covers should be removed except by ZONARE factory trained personnel. Failure to do so may void the system warranty or service contract coverage Warnings.*

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

WARNING

Do not operate the Z.ONE*Ultra system in the presence of flammable anesthetics or in a room recently washed with flammable cleaning and disinfecting agents. Cleaners can produce explosive vapors. Check labels of original containers of cleaners and disinfectants for warnings about vapors. Thoroughly ventilate the room, if such vapors may potentially be present, prior to activating any of the* Z.ONE*Ultra components.*

2.2 Battery WARNINGs

WARNINGS.

- *The battery has a safe smart device. Do not disassemble or alter the battery in any way.*
- *Charge the battery at room temperature.*
- *Do not short-circuit battery by directly connecting the positive and negative terminals with metal objects.*

- *Do not heat or discard battery in a fire.*
- *Do not expose the battery to temperatures above 150 degree F.*
- *Do not charge the battery near a heat source*
- *Do not leave battery in direct sunlight*
- *Recharge battery only using Scan Engine in a docked condition in* Z.ONE*Ultra SuperCar or miniCartt, or remotely using ZONARE Z.ONE battery charger.*
- *Do not use a damaged battery.*
- *Inspect the battery for damage before charging or placing the battery in the* Z.ONE*Ultra.*
- *Do not connect battery to an electrical power outlet.*
- Do not continue to recharge the battery if it does not recharge fully after 4 hours
- Battery **MUST** be **REMOVED** from Scan Engine, during shipping/transport of the Z.ONE*Ultra*

2.3 CAUTIONs During Service

CAUTIONS

- *Apply proper line voltage. Verify that the* Z.ONE*Ultra system is compatible to match the AC voltage of site receptacle. Also verify that all plugs match the receptacle type. Mismatched voltage or plug configuration can damage system components.*
- *Protect the system from water or other liquids that could drip into the electronic components.*
- *Do not drop the transducer(s), or allow them to impact any hard surfaces.*

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

– *Avoid allowing metal contact pins on connector-end of transducers to come in contact with foreign surfaces (potential for bending pins).*

– *Perform no unauthorized modification to any of the* Z.ONE*Ultra sub-systems. Unauthorized modification can introduce additional hazards to the product.*

2.4 Battery CAUTIONs

CAUTIONS

– *To protect the battery from potential thermal damage, the system monitors the temperature of the battery at all times. If the battery is detected as exceeding the maximum safe operating temperature, a warning message will appear on the display of the* Z.ONE*Ultra.*

– *To prevent possible damage to the unit, the battery should be REMOVED from the Scan Engine prior to transport or shipment.*

– *Do not immerse battery in water or allow it to get wet.*

– *Do not put the battery into a microwave oven or pressurized container.*

– *Use only batteries provided by ZONARE*

– *Store the battery between* -20 to 60° Celsius (-4° to 158° F).

– *If the battery leaks, emits orders, emits heat, is deformed or discolored in any way immediately remove it and stop using it.*

2.5 USB Memory Stick CAUTIONs

CAUTIONS

USB Memory Sticks that are purchased from outside sources (besides Zonare) may not be compatible for use in the Z.ONE*Ultra. USB Memory Sticks which are labeled as "**U3 Smart Technology**" on their label or packaging, will NOT be recognized (or function) in the* Z.ONE*Ultra.*

In the case of having one of these incompatible format USB Memory Sticks. There are freeware U3 Smart Technology "Removal" programs available on the internet, that can be downloaded and run to make the USB Memory Sticks useable on the Z.ONE*Ultra*

2.6 Networking CAUTION

CAUTIONS

In order to comply with Electro-Magnetic Compliance it is necessary that the Z.ONE*Ultra be connected to available Ethernet resources using a high quality, shielded **CAT-5** cable.*

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

3 SYSTEM SPECIFICATIONS

This section contains Z.ONE*Ultra* system and accessory specifications. For information on the specifications for ZONARE authorized peripherals, refer to the manufacturers' documentation.

3.1 System Dimensions

SmartCart (with Scan Engine installed)

- Height:

  - Max operational: 157.5 cm (62 in)

  - Min operational: 128 cm (50.5 in)

  - Display lowered for transport: 104 cm (41 in)

- Width: 51 cm (20.1 in)
- Depth: 72 cm (28.2 in)
- Weight: 57 kg (125lb.)

***mini*Cart (with Scan Engine installed)**

- Height:

  - Max operational: 160 cm (63 in)

  - Min operational: 134 cm (53 in)

  - Display lowered for transport: 104 cm (41.5 in.)

- Width: 57.2 cm (22.5 in)
- Depth: 56.1 cm (22.0 in)
- Weight: 55 kg (132 lbs.)

Scan Engine

- Height: 7.3 cm (2.9 in)
- Width: 18.7 cm (7.4 in)
- Depth: 25 cm (9.8 in)
- Weight: 2.5 kg (5.6 lb) – with battery, no probe

Scan Module

- Height: 5.3 cm (2.1 in)
- Width: 22.3 cm (8.8 in)
- Depth: 25 cm (10.0 in)
- Weight: 1.6 kg (3.5 lb)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

3.2 Displays

SmartCart

- 19” high resolution color LCD display
- 1280 x 1024 display format (internal)
- 1280 x 1024 / 800 x 600 video format - *configurable* (HDMI output)
- 0.41 mm pixel pitch
- Viewing angle (H/V): 170 degrees typical
- Minimum 10:1 contrast
- +/- 90^{o} rotation
- 30^{o} backward tilt
- Full 90^{o} forward tilt into secure transport position
- Advanced setup parameters via on-screen menu
- Integrated system programmed video settings
- Multi-Transducer Port (3 Connectors) - Option

***mini*Cart**

- 13” high resolution color LCD display
- 640x480 display format (internal)
- 0.41 mm pixel pitch
- Viewing angle (H/V): 170 degrees typical
- Minimum 10:1 contrast
- +/- 90^{o} rotation
- 30^{o} backward tilt
- Full 90^{o} forward tilt into secure transport position
- Integrated system programmed video settings

Scan Engine

- 5.8” high resolution color LCD display
- 800x480 display format (internal)
- 640x480 video format (HDMI output port)
- 0.16 mm pitch
- Manual Brightness and Contrast controls
- USB 2.0 I/O port (one)
- DC power (+12V) input port

Scan Module

- 640x480 video format (HDMI port)
- USB 2.0 port (one)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- DC power (+12V) input port

3.3 Image Archive or Export Storage

Scan Engine - Internal:

IMPORTANT

*The image storage capacity numbers listed below apply **ONLY** to standalone (undocked) Scan Engine use, or use when docked in a **miniCart**. In these applications resolution of the individual image is **640 x 480**.*

*The image storage capactiy numbers, when a Scan Engine is being used while docked in a SmartCart, will be approximately 1/3 less. This is due to the higher image resolution of **800 x 600** that is used in the Z.ONEUltra application.*

- 512MB Internal CompactFlash Storage (Standard)

- DICOM uncompressed: 1280 images
- DICOM RLE: 4060 images
- BMP: 1700 images

- 2GB Internal CompactFlash Storage (Option)

- DICOM uncompressed: 5000 images
- DICOM RLE: 15,900 images
- BMP: 6650 images

SmartCart - Internal:

- Internal Hard Drive *(120GB version specs referenced below)*

- DICOM uncompressed: 300,000 images
- DICOM RLE: 944,000 images
- BMP: 399,0000 images

- Slimline Internal DVD+RW / CD-RW Drive

Cart S/N 3xxx and below:

- ATAPI (Parallel) Interface
- 24X speed writing for CD-R, DVD+R, or DVD+RW discs

Cart S/N 4xxx and above:

- USB (Serial) Interface
- 24X speed writing for CD-R, DVD+R, or DVD+RW discs

3.4 Transducers

C10-3 ..... (I.D. 3)

- Penetration Depth 13 CM

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- Number of Elements 64
- Field of View 80 degrees
- Radius of Curvature 16 mm
- Ultrasound Bandwidth 10-3 MHz

C9-4T Convex .....(I.D. 146)

- Penetration Depth 14 CM
- Number of Elements 128
- Field of View 135 degrees
- Radius of Curvature 11.5 mm
- Ultrasound Bandwidth 9-4 MHz

C9-3 Convex.....(I.D. 130)

- Penetration Depth 18 CM
- Number of Elements 128
- Field of View 67 degrees
- Radius of Curvature 33 mm
- Ultrasound Bandwidth 9-3 MHz

C8-3$_{3D}$ 3-D ..... (I.D. 140)

- Penetration Depth 24 CM
- Number of Elements 128
- Field of View 79 degrees
- Radius of Curvature 40 mm
- Ultrasound Bandwidth 8-3 MHz

C6-2 Convex.....(I.D. 129)

- Penetration Depth 24 CM
- Number of Elements 128
- Field of View 65 degrees
- Radius of Curvature 50 mm
- Ultrasound Bandwidth 6-2 MHz

C5-2 Convex..... (I.D. 128)

- Penetration Depth 24 CM
- Number of Elements 128
- Field of View 65 degrees
- Radius of Curvature 50 mm
- Ultrasound Bandwidth 4-1 MHz

C4-1 Convex.....(I.D. 2)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- Penetration Depth 30 CM
- Number of Elements 64
- Field of View 80 degrees
- Ultrasound Bandwidth 4-1 MHz

L14-5sp Linear..... (I.D. 70)

- Penetration Depth 6 CM
- Number of Elements 128
- Field of View 26 mm
- Ultrasound Bandwidth 14-5 MHz

L14-5W Wide Aperture Linear..... (I.D. 66 or 71)

- Penetration Depth 10 CM
- Number of Elements 192
- Field of View 55 mm
- Ultrasound Bandwidth 14-5 MHz

L12-4V Veterinary..... (I.D. 67)

- Penetration Depth 10 CM
- Number of Elements 128
- Field of View 63 degrees
- Ultrasound Bandwidth 12-4 MHz

L10-5 Linear..... (I.D. 64)

- Penetration Depth 10 CM
- Number of Elements 128
- Field of View 38 mm
- Ultrasound Bandwidth 10-5 MHz

L8-3 Linear..... (I.D. 65)

- Penetration Depth 10 CM
- Number of Elements 128
- Field of View 38 mm
- Ultrasound Bandwidth 8-3 MHz

E9-3 3-D ..... (I.D. 141)

- Penetration Depth 14 CM
- Number of Elements 128
- Field of View 135 degrees
- Radius of Curvature 10.0 mm

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- Ultrasound Bandwidth 9-3 MHz

EV9-4 Transvaginal..... (I.D. 144)

- Penetration Depth 14 CM
- Number of Elements 128
- Field of View 135 degrees
- Radius of Curvature 12 mm
- Ultrasound Bandwidth 9-4 MHz

P10-4 Phased (version 1)..... (I.D. 7)

- Penetration Depth 14 CM
- Number of Elements 128
- Field of View 80 degrees
- Ultrasound Bandwidth 10-4 MHz

P10-4 Phased (version 2)..... (I.D. 14)

- Penetration Depth 12 CM
- Number of Elements 128
- Field of View 79.6 degrees
- Ultrasound Bandwidth 10-4 MHz

P8-3 TEE .....(I.D. 8)

- Penetration Depth 18 CM
- Number of Elements 64
- Ultrasound Bandwidth 7.5-2.7 MHz

P4-1 Phased ..... (I.D. 4)

- Penetration Depth 30 CM
- Number of Elements 128
- Field of View 84 degrees
- Ultrasound Bandwidth 4-1 MHz

P4-1c Phased .....(I.D. 5 or 6)

- Penetration Depth 30 CM
- Number of Elements 64
- Field of View 84 degrees
- Ultrasound Bandwidth 4-1 MHz

A2CW Doppler-Only *(CW Option Required)* **– I.D. 514)**

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- Number of Elements 2
- Ultrasound Frequency 2.0 MHz
- Ultrasound Bandwidth n/a

A5CW Doppler-Only *(CW Option Required)* **– I.D. 513)**

- Number of Elements 2
- Ultrasound Frequency 5.0 MHz
- Ultrasound Bandwidth n/a

3.5 Accessories/Options

- 2-Pedal Footswitch (*Freeze/Store*)
- 2-Bay Battery Charger
- AC Power Adapter
- USB Memory Stick
- **AVED** (Audio Video Extension Device) Box
  - NTSC output:
    - Horizontal frequency:.....15.733 KHz
    - Vertical frequency:.....59.94 Hz.
  - PAL output:
    - Horizontal frequency:.....15.625 KHz
    - Vertical frequency:.....50.0 Hz.

3.6 Peripherals

SmartCart:

On-Board (Mounted) – Local Image Printing

- Sony UP-D897 USB Digital B/W Printer

Off-Board (Un-mounted)

- Sony UP-D25MD Color Printer
- HP LaserJet (PostScript-3 style) Network Printer ---------- (Report printing only)

***mini*Cart**:

- Sony UP-D897 Digital B/W Printer

3.7 Site Requirements

Power

- 100 – 120VAC, 50-60Hz or 200 – 240VAC, 50-60Hz (Factory Configurable)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Environmental

- Cooling consistent with 1024 BTU / hour system output (Scan Engine + SmartCart/*mini*Cart)
- Ambient air temperature of 0^{o} – 35^{o} Celsius (32^{o} - 95^{o} F)
- Ambient relative humidity of up to 80%, non-condensing

3.8 System Power

- **SmartCart**
  - 90 – 120V @ 6A (max)
  - 200 – 240V @3A (max)
  - Line Frequency: 50 – 60Hz
  - 250 W-h - Nickel Metal Hydride (NiMH) battery pack - *(Option)*
- ***mini*Cart**
  - 100 – 120V @ 6A (max)
  - 200 – 240V @3A (max)
  - Line Frequency: 50 – 60Hz

3.9 System Power Protection

- **SmartCart**
  - Re-settable AC circuit breaker
- ***mini*Cart**
  - User-replaceable fuses:
    - T6.3A/250V ..... (100-120V Systems)
    - T3.15A/250V ..... (200-240V Systems)

3.10 Electrical Specifications

DC Voltages:

- **SmartCart DC Power Supplies**

Voltage	Purpose	Max Current Rating
+12V	VMain Logic Power	12 A
+12V	VScanner Power	8 A
+7 to +14V	VFan Power	variable

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

+12 to +25V	*VAux Power (Peripherals)*	*Future use*

- ***mini*Cart DC Power Supplies**

Voltage	Purpose	Max Current Rating
+12V	Scan Engine Power	20 A
+12V	LCD Display Source Power	6 A
+5V	USB Hub Power	8 A

- **Scanner Power Board DC Supplies**

Voltage	Purpose	Total Current
+1.2V	DSP Power	2.3 A
+1.5V	Digital FPGA (Digital Board)	11.2 A
	Striker (Analog Board)	
+1.8V	FPGA busses	7.4 A
	ADC's	
	ADC's and AFE's	
+2.5V	DDR SDRAM	0.30 A
+3.3V	CPU, FPGA's, etc.	2.5 A
Vfan	Cooling fans	0.25A
+5.0V	Power Supply monitoring	10 mA
	Levels shifters, muxes, eeprom.	
V5.0RTC	Local power for PIC, etc.	25 mA
+12V	Pulsers	170 mA
HV1	Probe Mux Bias Power	Transducer dependent
HV2	Transmit Power (Tissue)	User variable
HV3	Transmit Power (Doppler)	User variable

- **"Z-Pack" Battery (SmartCart) –** *(Option)*

  - Battery, 13-cell, 15.6 VDC, 16 A-hours, rechargeable Nickel Metal Hydride battery pack
  - Weight: 7.7 lbs.
  - Operating range: (values listed are approximations)

    - Active use ..... At least 1 hour (mode/display brightness dependent)
    - Storage mode ..... Less then 50% loss - 1 month

- **Battery (Scan Engine)**

  - Battery, 4-cell, 7.4 VDC, 4.4 amp-hours, rechargeable lithium ion battery pack
  - Operating range: (values listed are approximations)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- Active use ..... 30-40 minutes (mode & display brightness dependent)
- Standby mode ..... 2.0-3.0 hours
- Storage mode (in Scan Engine) ..... 3 weeks

- **(Scan Engine) Battery Charger, 2-Bay**

  - Models:
    - Z311: Domestic Version..... 110 VAC power cord
    - Z312 : International Version ..... 220VAC power cord
  - Operating Modes:
    - **CHARGE** Mode ..... 1.0 hour (dependent current charge state)
    - **RECALIBRATE** Mode..... 14 hours (discharge->charge->discharge-fully charge)
  - Bays:
    - Left Bay ..... **Recalibrate** or **Charge** operation
    - Right Bay..... **Charge** operation only

- **AC Power Adapter (Advanced Hardware Scan Engine)**

  - Models:
    - Z316 : Domestic Version..... 110 VAC power cord
    - Z317 : International Version ..... 220 VAC power cord
  - Voltage Output
    - +9V to +12V..... +/- 5% over loading

3.11 Temperature, Humidity, Pressure Limits

System: (During Operation)**:**

- Temperature 0^{o} to 35^{o} Celsius | (32^{o} to 95^{o} F)
- Relative Humidity 15–80%
- Elevation 3,100 to (-116) Meters | 10,200 to (-1,250) Feet

System: (During Shipping/Storage)**:** ***Battery <u>MUST</u> be REMOVED from Scan Engine!***

- Temperature -20 to 60^{o} Celsius | (-4^{o} to 158^{o} F)
- Relative Humidity 15–90%
- Elevation 5,944 to (-116) Meters | 19,500 to (-1,250) Feet

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

3.12 Device Classification

- FDA Class II Device Classification
- CE / MDD Class IIa-rule 10 active device intended for diagnosis

3.13 Safety Standards

All ZONARE instruments, cables, and diagnostic ultrasound imaging transducers have been designed to meet the essential requirements contained in:

- 93/42/EEC (Medical Device Directive).

In addition, all the above listed equipment meets the following appropriate requirements:

- UL 60601-1 (Standard for Medical Electrical Equipment Part 1: General Requirements for Safety)
- IEC 60601- (Medical Electrical Equipment Part 1: General Requirements for Safety)
- JIS-T-1001 (General Requirements of Medical Electrical Equipment), including limits for current leakage and isolation from a primary power line
- Testing for compliance with the essential requirements of the Medical Device Directive has been performed.

The Z.ONE*Ultra* meets the acoustic output emission guidelines established by the U.S. Food and Drug Administration (FDA). Acoustic output quantities have been measured, and are displayed, in accordance with the standards listed under “Guidance Documents”.

3.14 DICOM Standard

- NEMA PS 3.15: 2000, Digital Imaging and Communications in Medicine (DICOM)-Part 15: Security Profiles

3.15 Product Labeling

The following figures depict the labeling that is required by various regulatory authorities, and describe their location.

Contact ZONARE if any of these labels are missing or damaged beyond legibility. The Z.ONE*Ultra* labels herein are for reference only and are not shown to scale.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Figure 1: Label, Scan Engine – Serial/Part No.

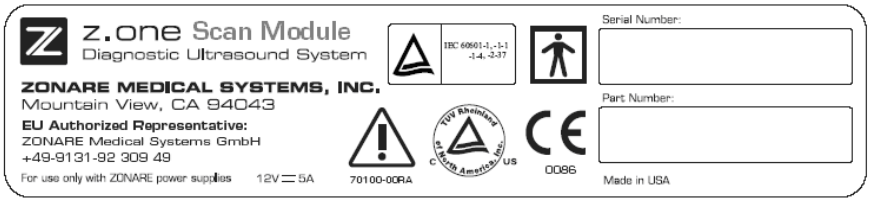


Figure 2: Label, Scan Module – Serial/Part No.

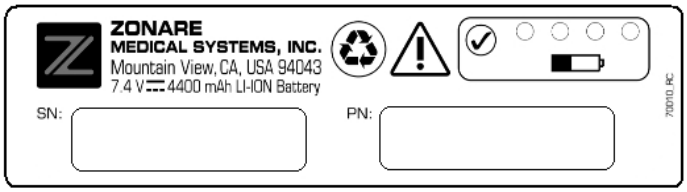


Figure 3: Label, Scan Engine Battery (Version 1) - Serial/Part No.

Figure 4: Label, Scan Engine Battery (Version 2) - Serial/Part No.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

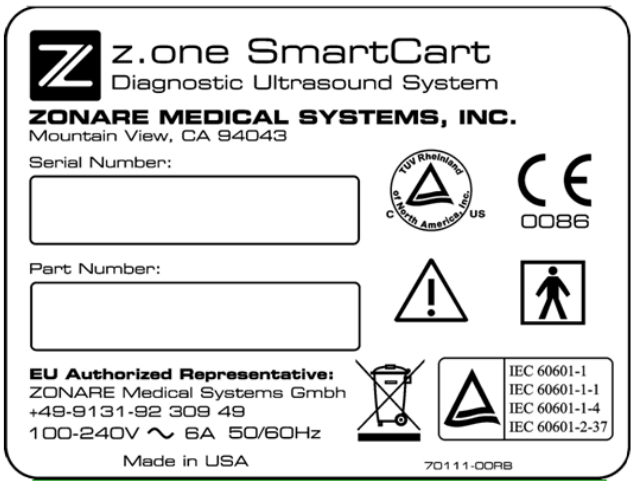


Figure 5: Label, 100V-240V SmartCart Rear Panel - Serial/Part No.

Figure 6: Label, SmartCart Z-Pak Battery

Figure 7: Label, *mini*Cart rear panel - Serial/Part No.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Figure 8: Label, Linear Array Transducers - Serial/Part No.

Figure 9: Label, Curved Array Transducers - Serial/Part No.

Figure 10: Label, Endo Cavity Transducer - Serial/Part No.

Figure 11: Label, Phased Transducers - Serial/Part No.

Figure 12: Label, Specialty Transducers - Serial/Part No.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Figure 13: Label, AC Power Battery Adapter

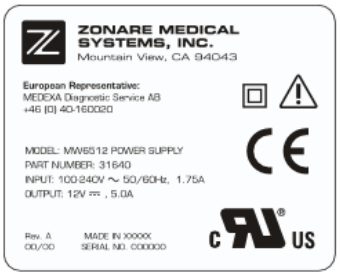


Figure 14: Label, AC Power Adapter Power Supply

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4 TOP-LEVEL PRODUCT OVERVIEW

4.1 Major Assembly Identification

SmartCart

***mini*Cart**

Scan Engine

Scan Module

Figure 15: Z.ONE*Ultra* Major Assembly Illustrations

4.2 Transducers

Linear

Curved

Phased

Endo-Cavity

CW Aux

TEE

Figure 16: Transducer Illustrations

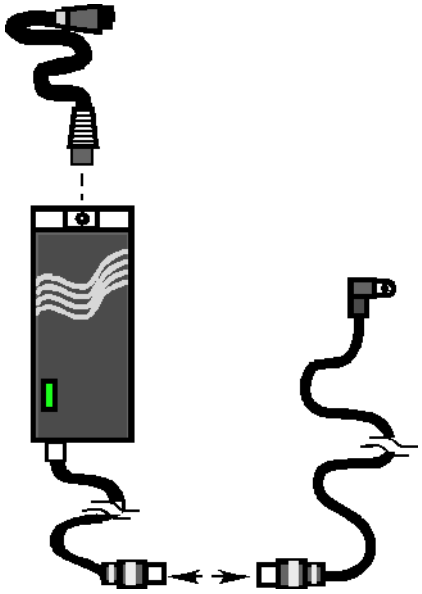
"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4.3 Accessory Components

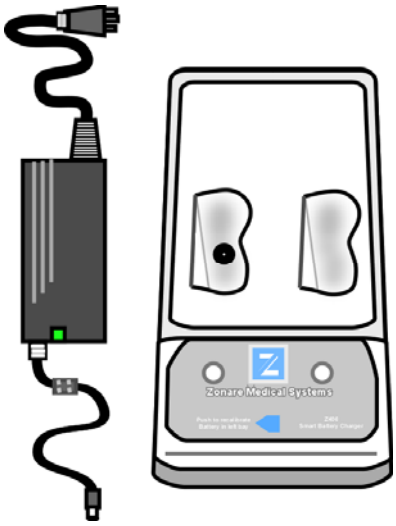
USB Memory Stick

Lithium-Ion Battery Pack

2-Pedal Footswitch



AC Power Adapter

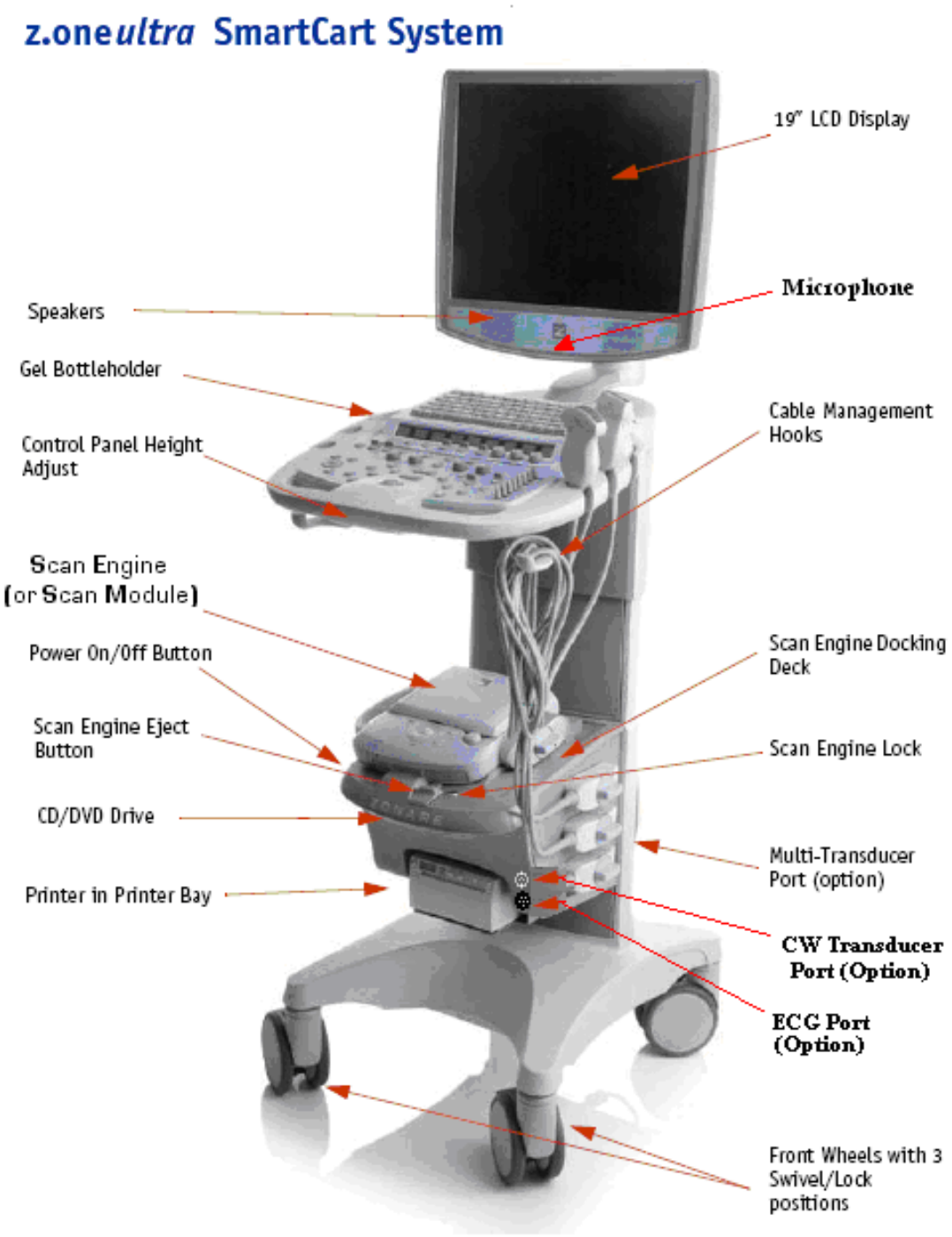


Battery Charger, 2-Bay

Figure 17: Accessories

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4.4 SmartCart Major Assemblies *(shown with MTP Multi- probe Option)*



"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4.5 miniCart Major Assemblies

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4.6 SmartCart User Interface Controls (Overview)

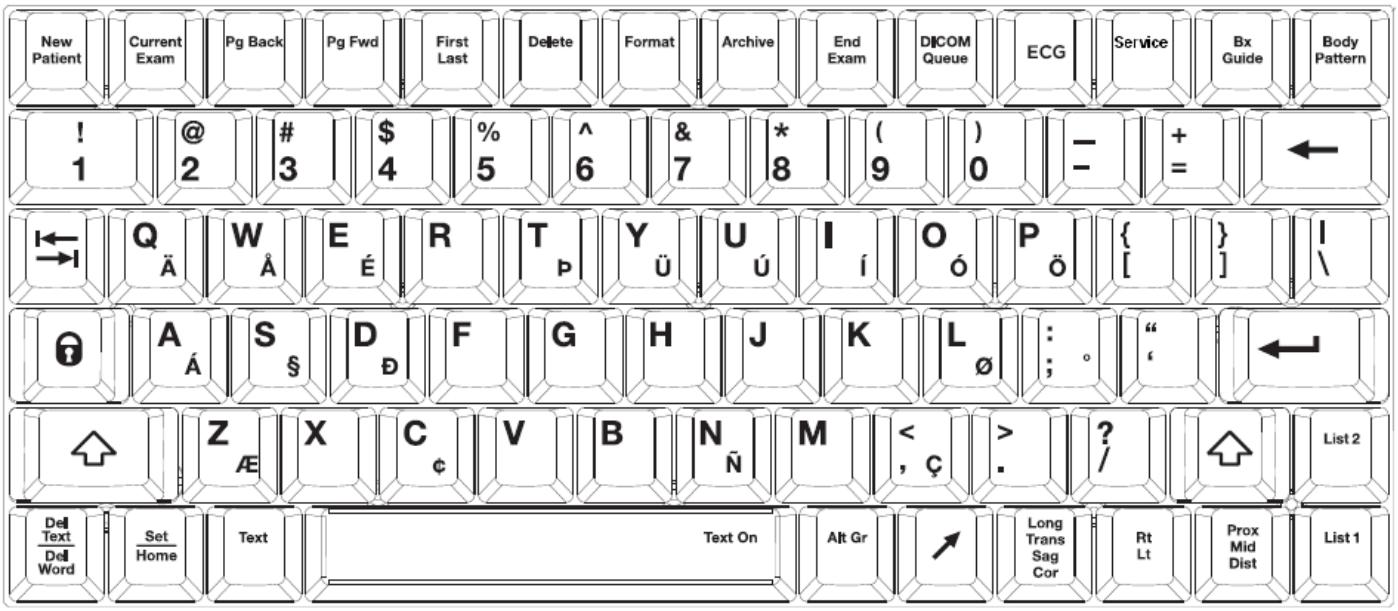


Figure 18: SmartCart Keyboard Controls (Overview)

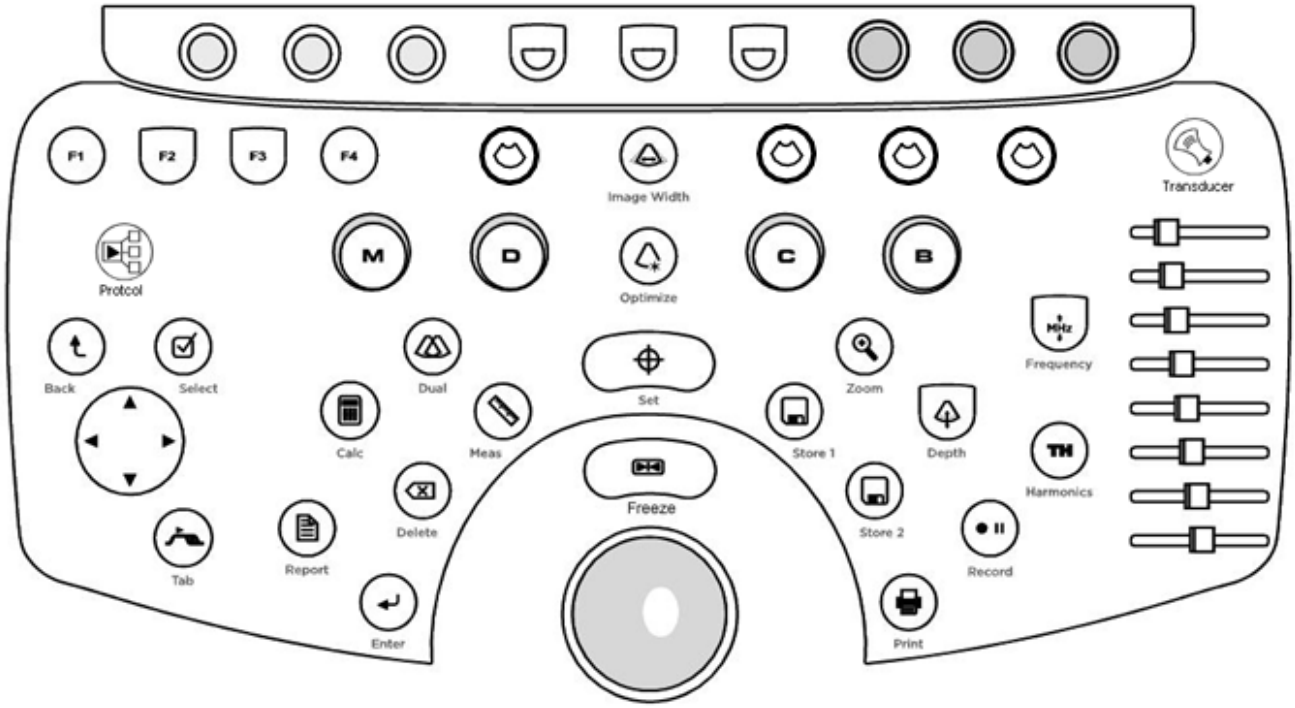


Figure 19: SmartCart User Interface (Version 1) Controls (Overview)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

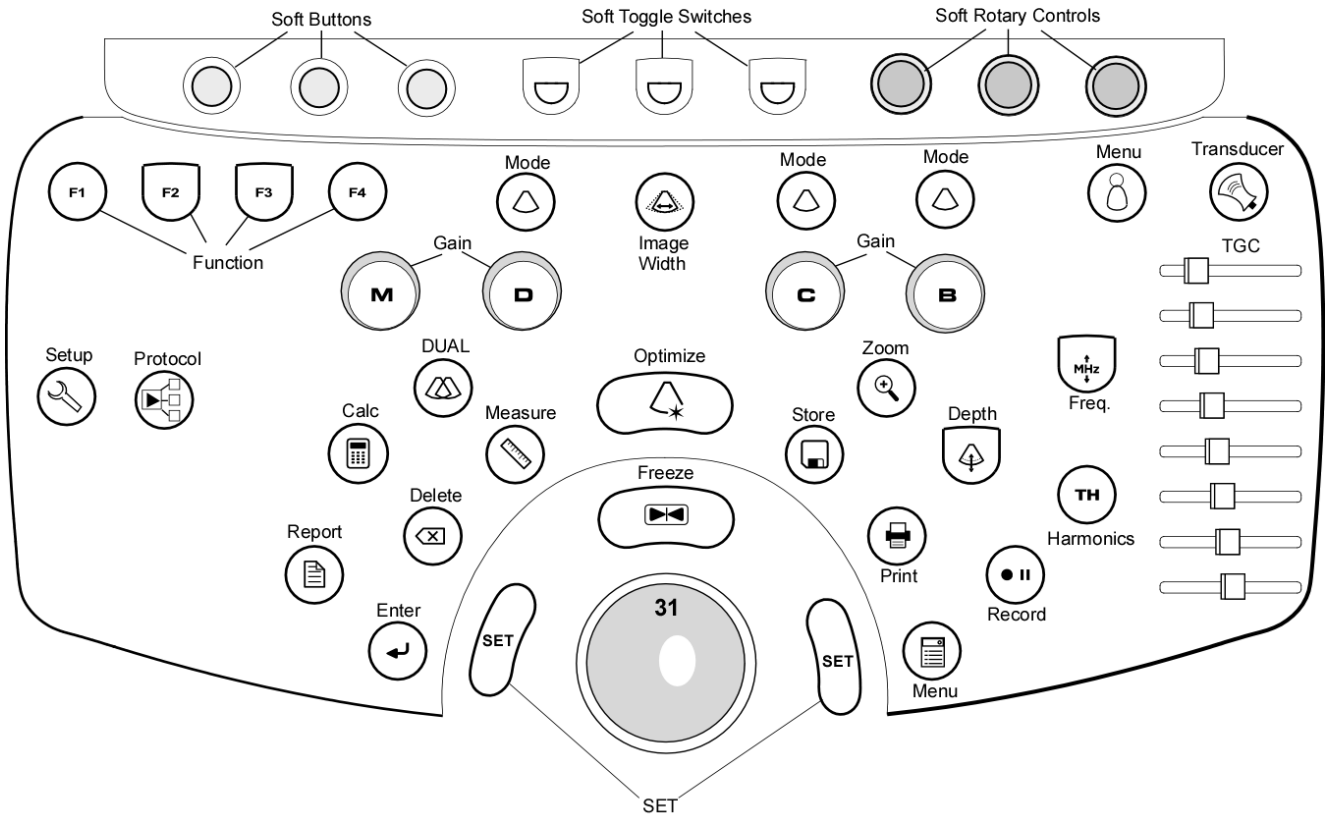


Figure 20: SmartCart User Interface ("Enhanced" version) Controls (Overview)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4.7 Scan Engine User Interface Controls (Overview)

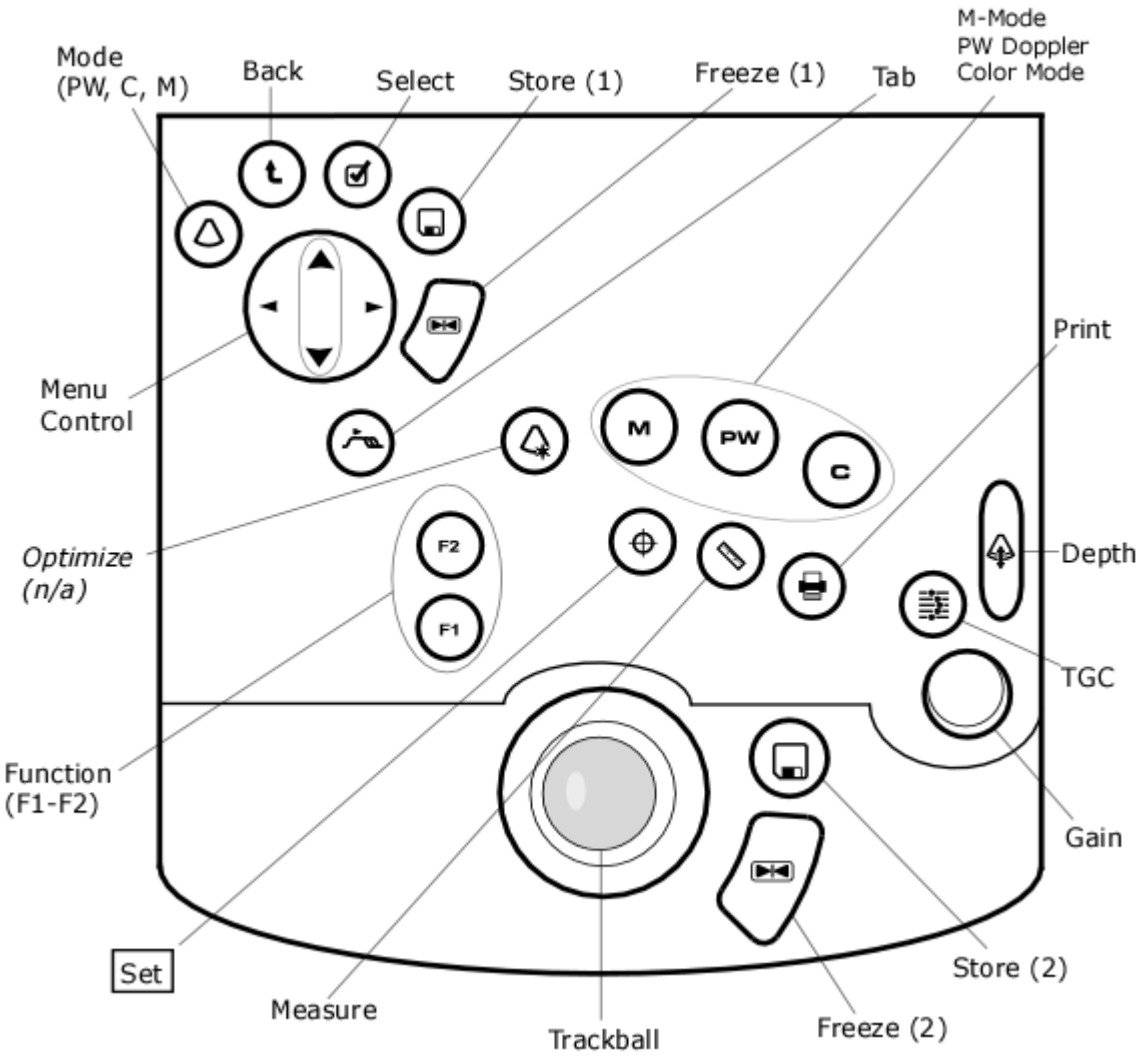


Figure 21: Scan Engine User Interface Controls (Overview)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4.8 SmartCart User Interface Controls (Detailed) – Version 1

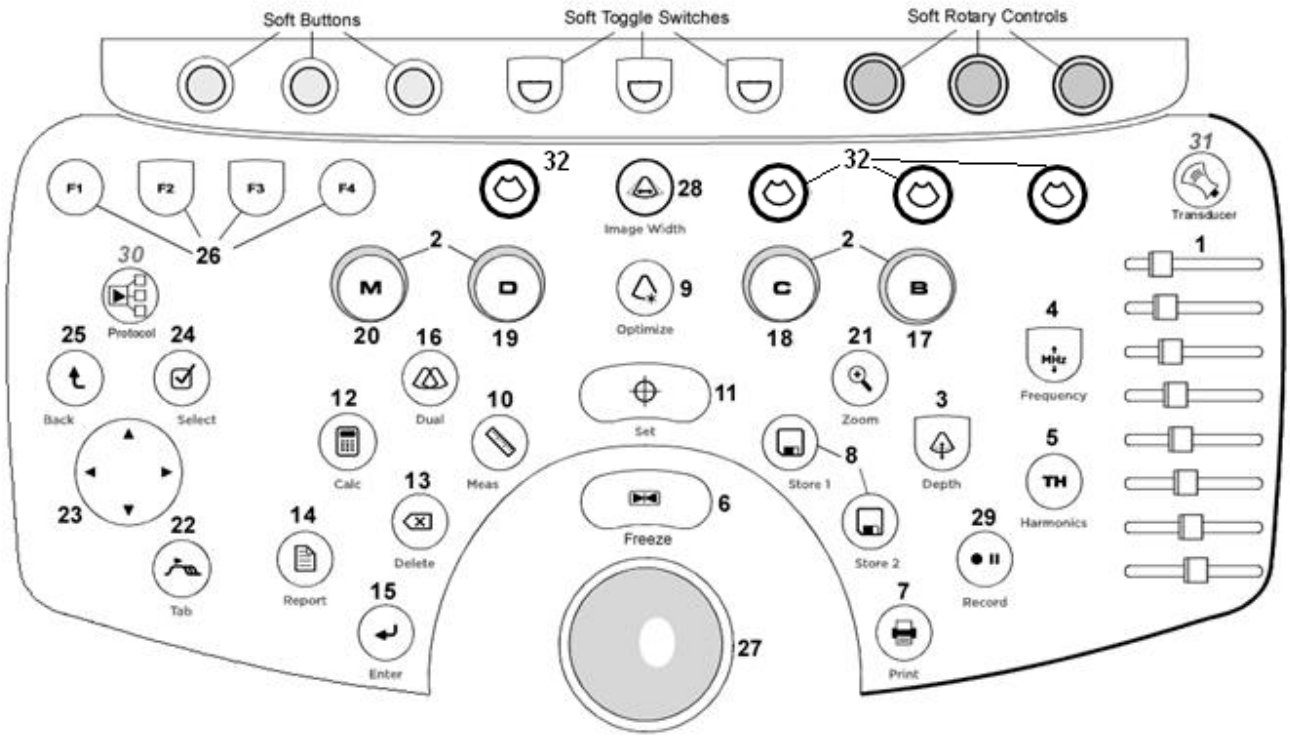
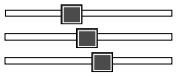
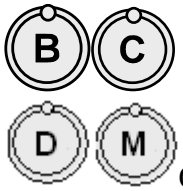


Figure 22: SmartCart User Interface Layout – Version 1

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

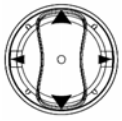
4.8.1 SmartCart User Interface Functions (Version 1)

Number	System Control	Description
1	 DGC Slidepots	Changes gain of image at discrete depths
2	 GAIN	Changes overall gain for applicable modality (outer ring)
3	DEPTH	Adjusts (Up/Down) the imaging depth of the display
4	FREQUENCY	Enables increasing/decreasing transmit frequency
5	HARMONICS	Activates tissue harmonics imaging mode
6	FREEZE	Halts or re-starts active imaging on the display
7	PRINT	Sends current image to device(s) previously specified in System Setup menu (Local Printer, DICOM printer, DICOM store).
8	STORE 1/2	Sends current image to device(s) previously specified in System Setup menu (Local Printer, DICOM printer, DICOM store).
9	OPTIMIZE	Dual function: "**ZST**" Sound Speed Correction and/or "**AutoOpt**" (DGC)
10	MEASURE	Multi function key:

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

			1) Brings up dynamic caliper (live) or Calc menu (frozen) 2) Toggles on/off the **Auto-Dop Trace** function, in PW Doppler mode
11		"**SET**"	Used to toggle the function of active items on display (equivalent to a "mouse click")
12		CALC	Brings up Calculation tools on the display
13		DELETE (Calc)	Deletes active Calculation tool from the display
14		REPORT (Calc)	Initiates a Calculation report
15		ENTER (Calc) /	Shared function key: 1) Ends the current Calculation process, and produces a result 2) Toggles between the (A) or (B) image, as the "Active" (selected) image, in DUAL mode
16		DUAL Mode	Activates/deactivates DUAL imaging mode
17		B	B- Mode (Tissue mode)
18		C	Color (Doppler) Mode, toggle activates/de-activates
19		D	Doppler (Pulsed Wave), toggle activates/de-activates
20		M	M-Mode (tissue motion), toggle activates/de-activates

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

21	ZOOM	Initiates the variable image magnification process
22	TAB	Advances through four (4) on-screen menus (*Imaging, Presets, Patient Info, Tools*)
23 	Menu Control	Functions like a computer mouse or joystick, for scrolling through on-screen menu selections (up/down), and modifying settings for selected on-screen functions (left/right)
24	SELECT	Activates currently highlighted selection in the on-screen menu.
25	BACK	Returns back one window, in the on-screen display menu
26	F1 –F4	Function keys, user configurable in System Setup menu
27	Trackball	Used for positioning the cursor, defining size/position of ROI in color mode, positioning measurement tools, reviewing cine-loop images and navigating form/tables/worksheets/reports
28	Image Width	Enables changing the width (angle) of the active scanning area of the B-Mode sector, to maximize frame rate
29	Record	Shared function key: 1) **Momentary Press**: Generates the remote print/record trigger signal out of the optional AVED box 2) **Extended Press**: Ejects the DVD/CD from the internal DVD drive in the SmartCart

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

30		Protocol	Used to enable controls for selecting timing (time or cardiac cycle) for Cine Clip stores.
31		Transducer (MTP)	Used to bring the available transducers to the OLED display windows, for selection of a desired transducer from the 3-Port MTP panel.
32		Mode Keys (4)	Mode functional assignment keys, User configurable in System Setup menu

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4.9 SmartCart User Interface Controls (Detailed) – *"Enhanced" Version* (2)

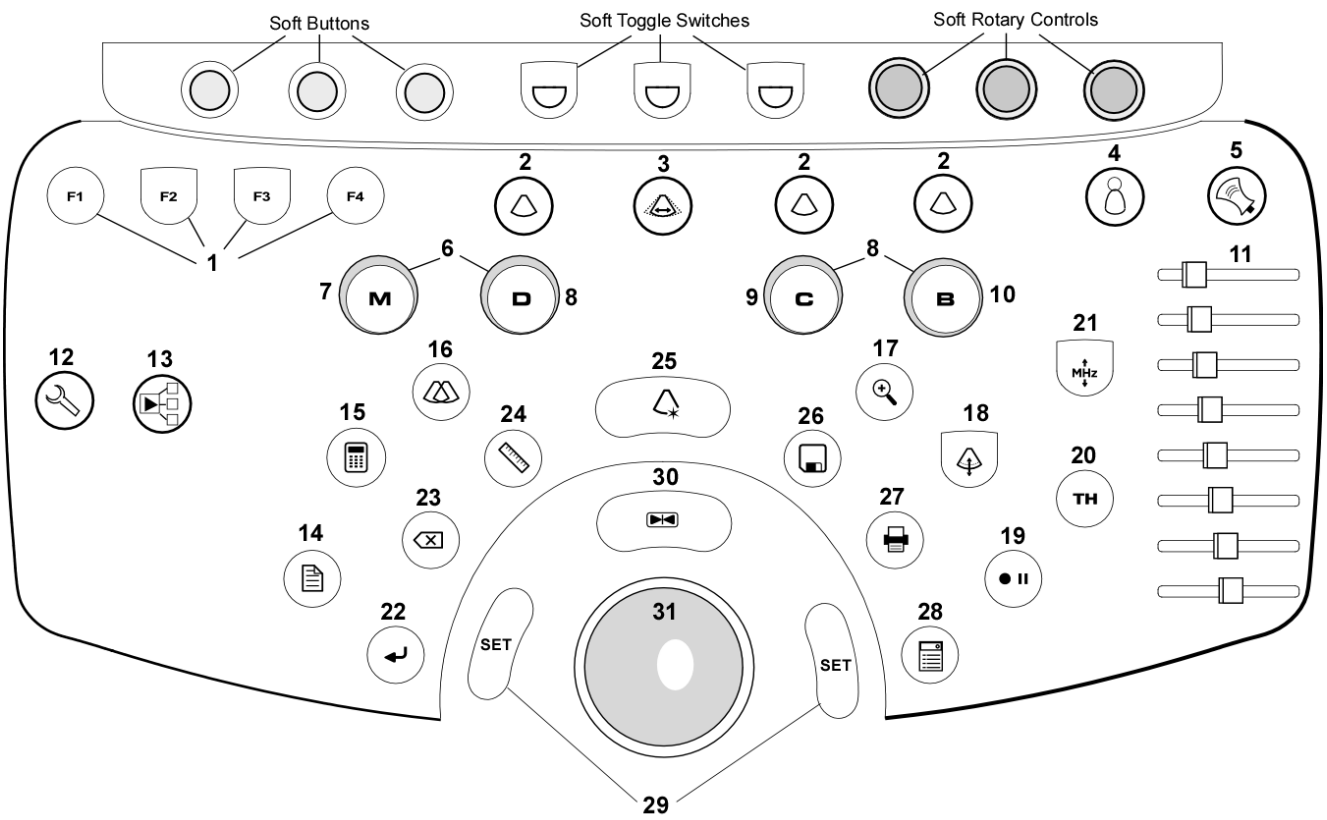
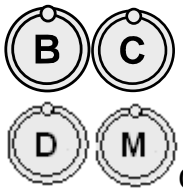


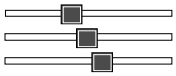
Figure 23: SmartCart User Interface Layout – "Enhanced" Version (2)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4.9.1 SmartCart User Interface Functions (Enhanced Version)

Number	System Control	Description
1	F1 –F4	Function keys, user configurable in System Setup menu
2	Mode Keys (3)	Mode functional assignment keys, User configurable in System Setup menu
3	Image Width	Enables changing the width (angle) of the active scanning area of the B-Mode sector, to maximize frame rate
4	Exam Type	Brings up **Exam Type**/**Presets** configuration menu, and 6 user Preset setting to OLED display windows
5	Transducer (MTP)	Used to bring the available transducers to the OLED display windows, for selection of a desired transducer from the 3-Port MTP panel.
6	 GAIN	Changes overall gain for applicable modality (outer ring)
7	M	M-Mode (tissue motion), toggle activates/de-activates
8	D	Doppler (Pulsed Wave), toggle activates/de-activates
9	C	Color (Doppler) Mode, toggle activates/de-activates

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

10		B	B- Mode (Tissue mode)
11		DGC Slidepots	Changes gain of image at discrete depths
12		SETUP	Used to bring up the SYSTEM SETUP configuration menu.
13		Protocol	Used to enable controls for selecting timing (time or cardiac cycle) for Cine Clip stores.
14		REPORT (Calc)	Brings up the Calculation report page
15		CALC	Brings up the Calculations menu page.
16		DUAL Mode	Activates/deactivates DUAL imaging mode
17		ZOOM	Initiates the variable image magnification process
18		DEPTH	Adjusts (Up/Down) the imaging depth of the display
19		Record	Shared function key: 1) **Momentary Press**: Generates the remote print/record trigger signal out of the optional AVED box 2) **Extended Press**: Ejects the DVD/CD from the internal DVD drive in the SmartCart
20		HARMONICS	Activates tissue harmonics imaging mode

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

21	FREQUENCY	Enables increasing/decreasing transmit frequency
22	ENTER (Calc) /	Shared function key: 1) Ends the current Calculation process, and produces a result 2) Toggles between the (A) or (B) image, as the "Active" (selected) image, in DUAL mode
23	DELETE (Calc)	Deletes active Calculation tool from the display
24	MEASURE	Multi function key: 1) Brings up dynamic caliper (live) or Calc menu (frozen) 2) Toggles on/off the **Auto-Dop Trace** function, in PW Doppler mode
25	OPTIMIZE	Dual function: "**ZST**" Sound Speed Correction and/or "**AutoOpt**" (DGC)
26	STORE	Sends current image to device(s) previously specified in System Setup menu (Local Printer, DICOM printer, DICOM store).
27	PRINT	Sends current image to device(s) previously specified in System Setup menu (Local Printer, DICOM printer, DICOM store).
28	MENU	Brings up access to four (4) on-screen menus (*Imaging*, *Presets*, *Patient Info*, *Tools*)
29		"**SET**" Used to toggle the function of active items on display (equivalent to a "mouse click")

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

30		FREEZE	Halts or re-starts active imaging on the display
31		Trackball	Used for positioning the cursor, defining size/position of ROI in color mode, positioning measurement tools, reviewing cine-loop images and navigating form/tables/worksheets/reports

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4.10 SmartCart & *mini*Cart Keyboard Controls (Detailed)

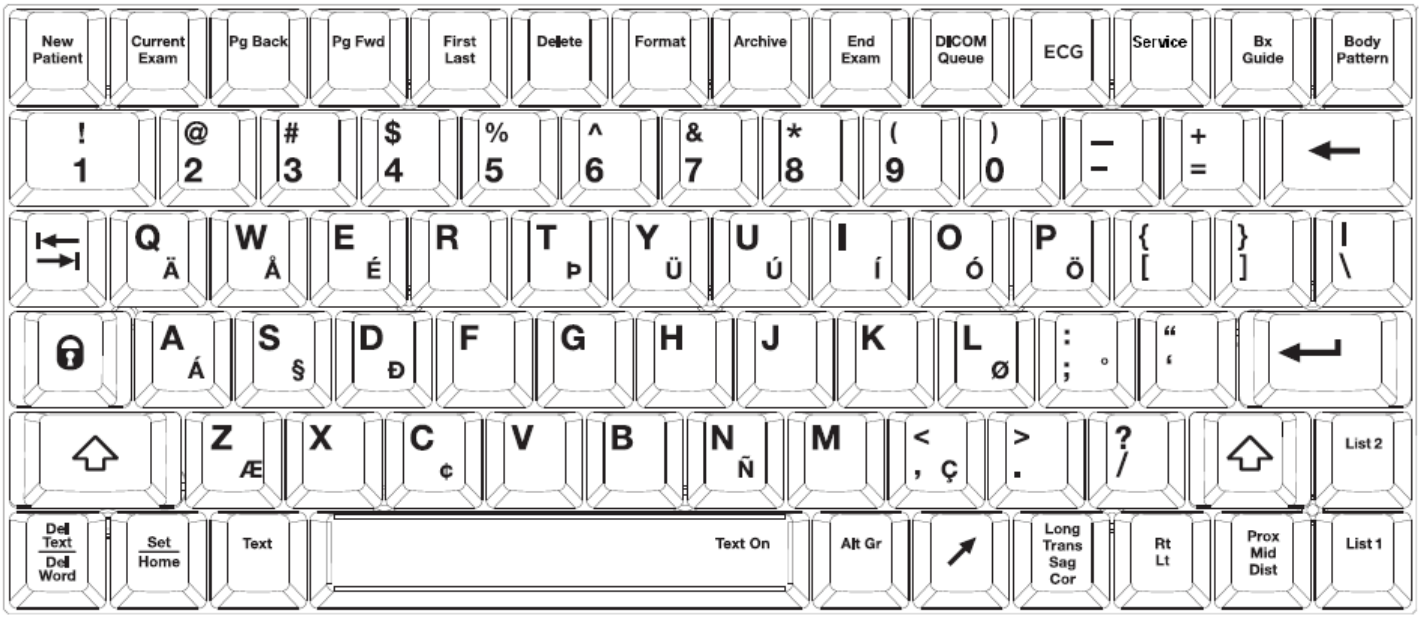


Figure 24: SmartCart Keyboard Layout

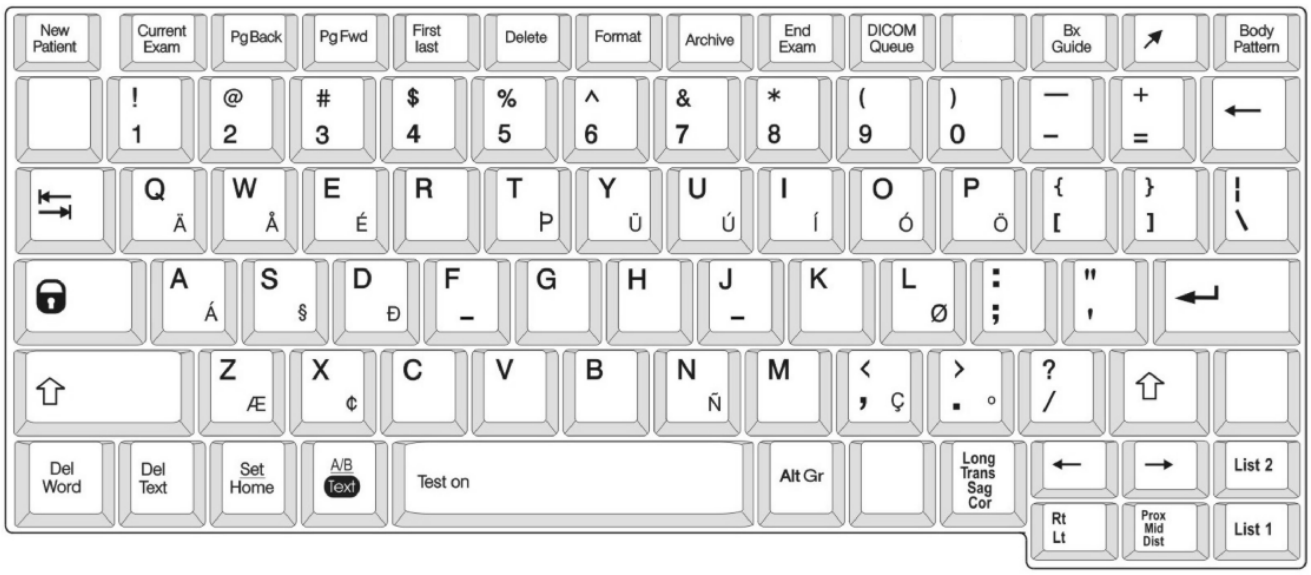
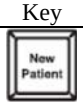


Figure 25: *mini*Cart Keyboard Layout

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

KEYBOARD: SPECIAL FUNCTION CONTROLS

Key	System Control	Description
	NEW PATIENT	This is a toggle key. The first press will display the Patient Information page. The second press will return to the imaging display.
	CURRENT EXAM	If there is an exam in progress, pressing this key will display the in-progress exam's images, most recently stored image displayed first. If there is no exam in progress, pressing this key will have no effect.
	PG BACK	This key only works when in in-progress exam review or archived exam review. Pressing this key will display the previous image, or page of images if in a multi-image display format. Once the first page is reached, the key press will have no effect.
	PG FWD	This key only works when in in-progress exam review or archived exam review. Pressing this key will display the next image, or page of images if in a multi-image display format. Once the last page is reached, the key press will have no effect.
	FIRST LAST	This key only works when in in-progress exam review or archived exam review. Pressing this key will toggle between the first stored image (or first page of images in a multi-image display format) and the last stored image (or last page of images in a multi-image display format).
	DELETE	This key only works when in in-progress exam review or archived exam review. When an image has been selected, pressing the Delete key will tag the image for deletion by drawing a red X through it. If the selected image already has been tagged for deletion (red X) pressing the Delete key will remove the red X, untagging the image.
	FORMAT	This key only works when in in-progress exam review or archived exam review. Pressing this key will toggle between the following image formats: 2 x 2, displaying 2 rows of 2 images (4 images); 3 x 2, displaying 2 rows of 3 images (6 images); and a full-size image.
	ARCHIVE	This is a toggle key. The first press will display the Patient Selection Table. The second press will return to imaging.
	END EXAM	When an exam is in progress, pressing the End Exam key will close the exam. If no exam is in progress, pressing this key will have no effect.
	DICOM QUEUE	This is a toggle key. The first press will display the DICOM queue. The second press will return to imaging.
	ECG	CARDIAC Option Systems ONLY: This is a toggle key. The pressing of this key will activate ECG operation and display the ECG trace on the monitor. A repeat press will turn off this function.
	SERVICE	This is a dual-function key. A "***quick***" momentary press is a shortcut to bring up the USER DIAGNOSTIC PANEL screen. An "***extended***" press will trigger a capture of a set of current LOG files to the internal archive
	BX GUIDE	This is a toggle key. The first press will display the biopsy needle path guide. The second press will remove the biopsy needle path guide.
	(Arrow)	This is a toggle key. It will only work when the image is frozen. Pressing the key when the image is frozen will display an arrow graphic in the middle of the display.
	BODY PATTERN	This is a cycling key. Pressing the Body Pattern key will display a Body Pattern for the Exam Type in use. Pressing the key will cycle through available Body Patterns, including a blank.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

	DEL WORD | DEL TEXT	Pressing Del Text will remove all text annotations and arrow graphics displayed. Pressing Shift+Del Word will delete the most recently entered text annotation, whether it be free text, POT, or List entry.
	SET | HOME	Pressing Home will move the text annotation cursor to its default home position. Pressing Shift+Set Home will set the current cursor position as the new Home position.
	TEXT	Pressing Text will display the text annotation cursor. Pressing Text again will remove the text annotation cursor.
	ALT GR	Alternate Graphics. Used in conjunction with the QWERTY keyboard, to enable access to international characters.
	LONG TRANS SAG COR	This is a cycling key. Pressing this key will cycle between displaying LONG, TRANS, SAG, and COR, for selection as pre-created text annotation.
	RT LT	This is a cycling key. Pressing this key will cycle between displaying RIGHT and LEFT, for selection as pre-created text annotation.
	PROX MID DIST	This is a cycling key. Pressing this key will cycle between displaying PROX, MID, and DIST, for selection as pre-created text annotation.
	LIST 1	Pressing List1 key will display a list of text items entered in List 2.
	LIST 2	Pressing List 2 key will display a list of text items entered in List 2.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4.11 Scan Engine User Interface Controls (Detailed)

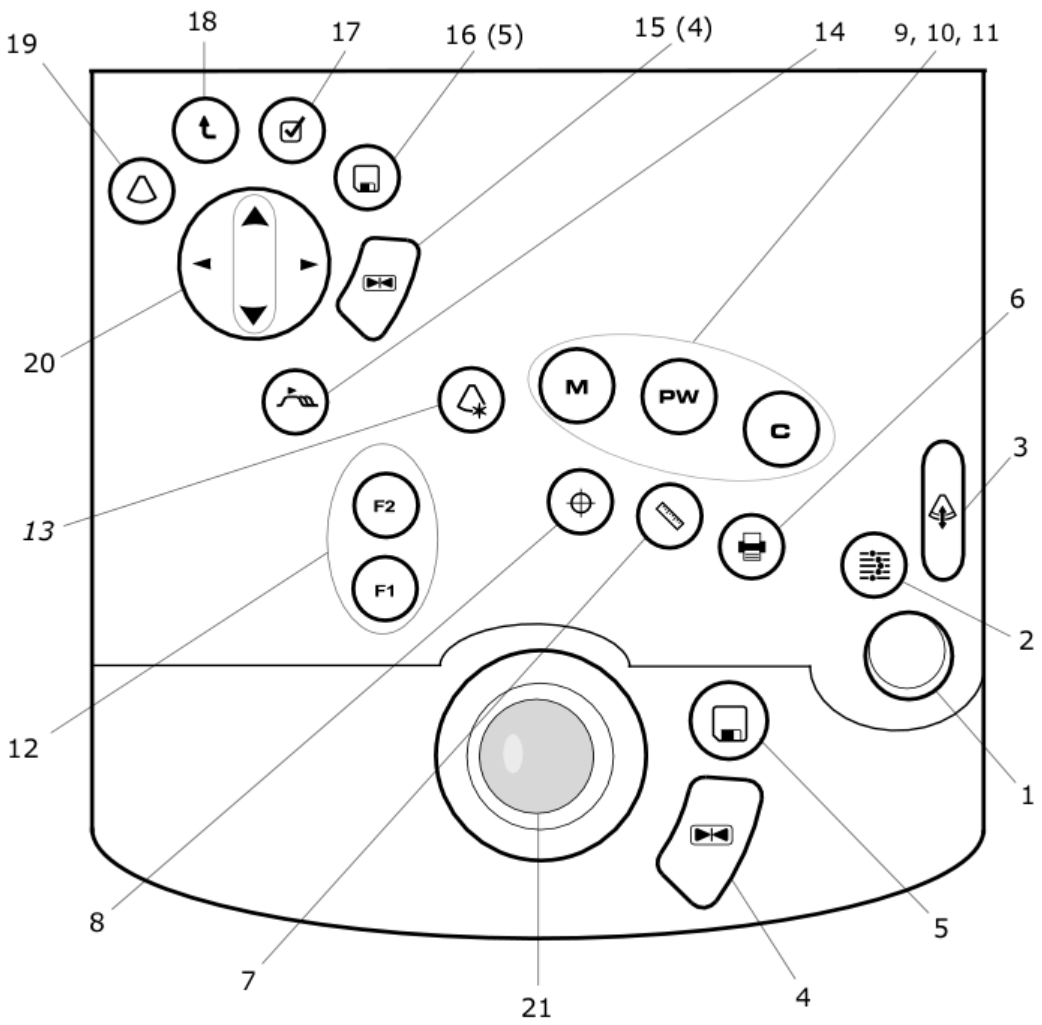
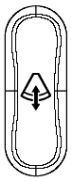


Figure 26: Scan Engine User Interface Layout (Detailed)

4.11.1 Scan Engine User Interface Functions

Number	System Control	Description
1	GAIN	Controls the overall gain for B-Mode and Color Doppler
2	DGC	Turns on the virtual DGC graphic

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

3	 DEPTH	Adjusts the imaging depth shown on the display
4, 16	FREEZE	Halts or re-starts active imaging
5, 17	STORE	Stores current image to the internal archive storage and sends images to device(s) previously specified in System Setup menu (DICOM printer, DICOM store, local Printer). When USB digital printer is selected, key press initiates sending a printed image to the B/W (or Color) printer
6	PRINT	Configurable for same functionality as **STORE** button above
7	MEASURE	Multi function key: 1) Brings up dynamic caliper (live) or Calc menu (frozen) 2) Toggles on/off the **Auto-Dop Trace** function, in PW Doppler mode
8	"**SET**"	Used to toggle a selected item/function on-screen
8	**C**	Color (Doppler) Mode, Activates/de-activates
10	**PW**	Pulsed Wave (Doppler), Activates/de-activates
11	**M**	M-Mode (tissue motion), Activates/de-activates

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

12	F1, F2	Function keys, user configurable in System Setup menu
13	OPTIMIZE	Dual function: "**ZST**" Sound Speed Correction and/or "**AutoOpt**" (DGC)
14	TAB	Advances through four (4) on-screen main menus (*Imaging, Presets, Patient Info, Tools*)
15, 16	*see item 4 and 5 above*	
17	SELECT	Activates the currently highlighted selection in the on-screen menu.
18	BACK	Returns back one window, in the on-screen display menu
19	MODE	Brings up the active scanning mode (C, PW, M) selection screen
20	Menu Control	Functions like a computer mouse or joystick, for scrolling through on-screen menu selections (up/down), and modifying settings for selected on-screen functions (left/right)
21	Trackball	Used for positioning the cursor, defining size/position of ROE in color mode, positioning measurement tools, reviewing cine-loop images and navigating form/tables/worksheets/reports

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4.12 SmartCart Rear I/O Panel: Layout & Functional Definitions

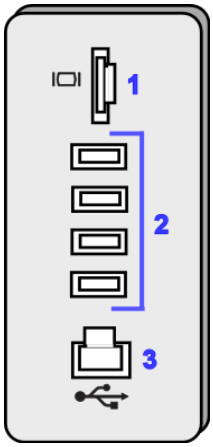


Figure 27: SmartCart Rear I/O Panel

4.12.1 Functions: I/O Connectors

#	Function	Direction
1	DVI Digital Video (Using HDMI connector)	Output
2	USB Ports (4)	Input/Output
3	Ethernet 10/100BaseT - (Network)	Input/Output

4.13 *mini*Cart I/O Connections: Layout & Functional Definitions

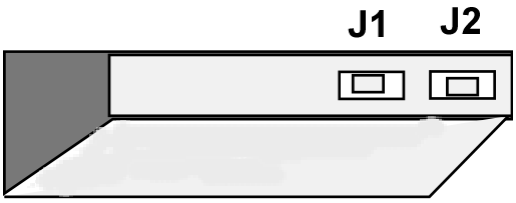


Figure 28: *mini*Cart USB Hub Connections

4.13.1 Functions: I/O Port Connectors

Jack #	Function	Direction
J1, J2	USB Ports - Hub	Input/Output

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4.14 Scan Engine/Scan Module Rear I/O Ports: Layout & Functional Definitions

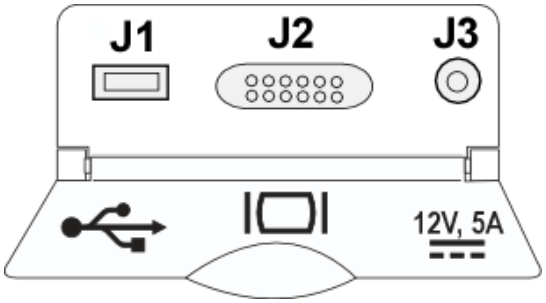


Figure 29: Scan Engine/Scan Module Rear I/O Connections

4.14.1 Functions: I/O Port Connectors

Jack #	Function	Direction
J1	USB Port	Input/Output
J2	DVI Video - – [HDMI connector]	Output
J3	+12VDC Input - (Zonare AC Power Adapter only!)	Input

4.15 AVED: Audio-Video Extension Device - I/O Panel: *(Option)*

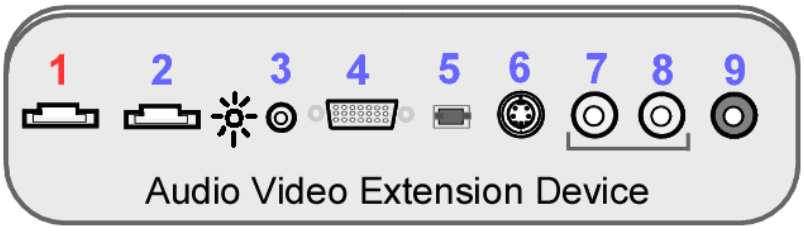
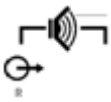
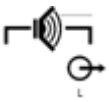


Figure 30: AVED Option - I/O Panel (SmartCart)

4.15.1 Functions: I/O Connectors

#		Function	Direction
1		DVI Digital Video/Audio (Using HDMI connector)	Input
2		DVI Digital Video (Using HDMI Connector)	Output
3	VCR CTL	VCR/Print Remote Triggers – 2 discrete signals (3.5mm)	Output

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4		VGA Video (Analog)	Output
5		TOS LINK Audio (Digital)	Output
6		S-Video (Analog) - *(800x600 mode only!)*	Output
7		Audio Out – Right (Analog)	Output
8		Audio Out – Left (Analog)	Output
9		Composite Video (Analog) - *(800x600 mode only!)*	Output

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

5 SYSTEM UNCRATING & INSTALLATION PROCEDURES

5.1 Product Shipment

Shipping containers should be inspected for damages, and the "Tip-n-Tell" indicator for signs of mishandling during shipment. If any problems are found, immediately notify the shipping carrier. All installation and set-up of equipment should be done following official ZONARE product installation procedures.

5.2 Electrical Requirements

Standard grounded (3-Prong) 110-120 VAC, 15 amp, 60Hz. wall outlets (or proper 220-240 VAC outlets for systems configured for these power requirements) are required for the Z.ONE*Ultra* Diagnostic Ultrasound System.

5.3 Environmental and Space Requirements

The Z.ONE*Ultra* Diagnostic Ultrasound System may be located anywhere within the facility, as long as there is adequate power outlets and remote network connectivity (at facilities utilizing a DICOM print/storage device hook-up).

5.4 Uncrating

5.4.1 SmartCart:

STEPS:

1. Prior to opening any packaging, inspect the "Tip-n-Tell" indicator (attached to the outside of the main shipping box) for signs that the Z.ONE*Ultra* has been subjected to shock or tilt conditions during shipment.
2. Also inspect the shipping container for any visual signs of rough handling or abuse during shipment.
3. Make notes of any discrepancies, and immediately report to the shipping carrier and to ZONARE's shipping department representative.
4. Remove all banding straps surrounding the cardboard main shipping container.
5. Lift off the top cover portion of the main cardboard shipping container, and set aside.
6. Remove the small boxes (containing the Z.ONE*Ultra* transducers and Scan Engine) from the inner storage box area (resting atop the SmartCart).
7. Lift the inner storage box upwards, and remove it from the main shipping container.
8. Grasping the sides, slide the cardboard main shipping box upwards, exposing the Z.ONE*Ultra*. Continue lifting until the cardboard box can be completely removed, and set aside.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Figure 31: Main shipping container removal

9. Remove the clear packing tape that is used to secure the foldable wooden loading ramp in its upward-facing shipping position. Lower the ramp on its hinges.

Figure 32: Loading ramp lowering

10. Remove the clear packing tape that secures the front support to the base during shipping. Grasp the removable front support section of the wooden shipping base (at the bottom-front of the system), pull it directly outwards away from the Z.ONE*Ultra*, and set aside.

Figure 33: Removable section of shipping base

11. Remove the plastic packaging bag to expose the Z.ONE*Ultra*.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Figure 34: Removing protective storage bag

12. Pull up to the top position on the brake pedal (at the front of the Z.ONE*Ultra*), to release locking of the SmartCart's wheels.

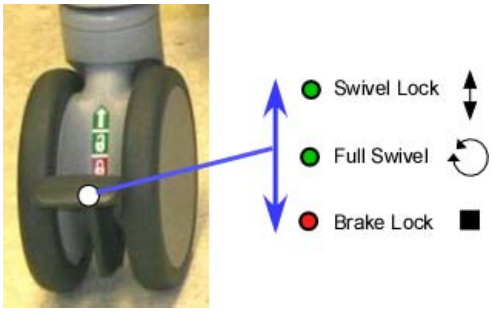


Figure 35: Brake release of wheels

13. Rotate the wheels from their 90 degree angled storage position, to be inline with the loading ramp and enable rolling the system out of crate.
14. Being careful to control the system's momentum, roll the Z.ONE*Ultra* down the ramp, and out of crate.
15. Remove all protective plastic wrap and foam packaging materials.
16. Inspect the entire Z.ONE*Ultra* for damage, paying close attention to the LCD display on the SmartCart.
17. Move the Z.ONE*Ultra* to the installation area.

5.4.2 *mini*Cart:

STEPS:

1. Prior to opening any packaging, inspect the "Tip-n-Tell" indicator (attached to the outside of the main shipping box) for signs that the Z.ONEUltra has been subjected to shock or tilt conditions during shipment.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

2. Also inspect the shipping container for any visual signs of rough handling or abuse during shipment.
3. Make notes of any discrepancies, and immediately report to the shipping carrier and to ZONARE's shipping department representative

4. Remove all banding straps surrounding the cardboard main shipping container.
5. Grasping the sides, slide the cardboard main shipping box upwards, exposing the *mini*Cart and container contents. Continue lifting until the cardboard box can be completely removed, set aside.

6. Remove the plastic covering and shrink wrap from the *mini*Cart and container contents.
7. Remove the small boxes (containing the Z.ONE*Ultra* transducers and Scan Engine) from the container.
8. On the container base, remove or cut the clear packing tape that secures the rear flap and unfold the rectangle cardboard support at the rear of the system. This rear flap is partially glued and will require a slight pull to release. This will provide an exit and slight ramp for removing the *mini*Cart from the base.

9. Unlock the brakes (two front wheels), and firmly grasp the rear handle.
10. Being careful to control the system's momentum, gently roll/lift the system down the ramp and off the base.

Note: Make sure that you are supporting the weight of the system while removing as the cardboard mock-ramp is not designed to support the full weight of the miniCart

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

11. Remove all protective plastic wrap and foam packaging materials.
12. Inspect the entire Z.ONE*Ultra* for damage, paying close attention to the LCD display on the *mini*Cart.
13. Move the Z.ONE*Ultra* to the installation area.

5.5 Mechanical Verification

STEPS:

1. Perform a check to verify proper operation of all of the following mechanical components.
   - Ensure wheels and brakes function properly
   - Raise and lower the Cart height adjuster (pull release lever located on the right of the system), to verify smooth operation and positive locking
   - Ensure the LCD display monitor rotates and adjusts properly
   - Place the Scan Engine onto the Scanner Deck and pull the Scan Engine towards you, to ensure full docking engagement.
   - Immediately report any mechanical discrepancies to ZONARE.

5.6 System Installation:

5.6.1 Initial Checks

STEPS:

1. Check to ensure all peripherals, software level, and serial numbers correspond with sales order. Make note of any missing items or discrepancies, and immediately report to ZONARE.
2. Check the two AC power rating labels, located by the system power receptacle and inside the rear cover by the AC outlet box, to verify power rating matches AC power level present at installation site.
3. Measure voltage at AC receptacle, at install site, to verify proper power levels are present.

WARNING

To prevent possible damage to the electronics of the Scan Engine from condensation, the following warning must be observed:

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

If the Scan Engine has been subjected to an environment during shipping/transport that differs greatly in temperature and/or humidity, from the environment where it has been moved for installation/intended operation, the unit should be allowed to stand for a period of no less than 30 minutes prior to inserting battery or powering on.

5.6.2 Installing the Battery Pack, into the Scan Engine

STEPS:

1. Remove the battery pack from its shipping materials
2. Correctly orient the battery pack and slide fully into the battery port on the Scan Engine, until fully seated (latched).

Figure 36: Battery Pack Installation

5.6.3 Docking Scan Engine (or Scan Module) into SmartCart

STEPS:

1. Place the Scanner in the molded area on the docking plate, so that it will align itself in the cradle.
2. Gently pull the Scanner towards you until you hear a clicking sound from the release lever securing the system into place.

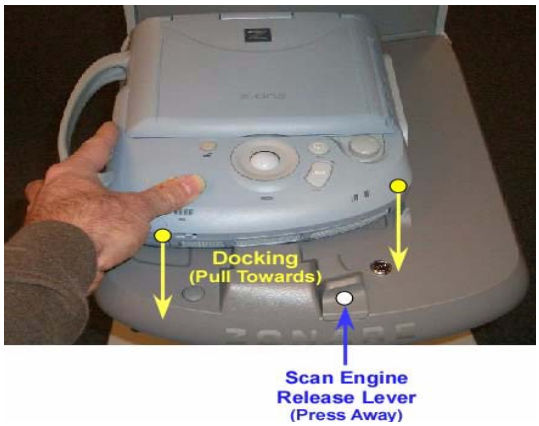


Figure 37: Scanner Docking in SmartCart

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

WARNING

To maintain the integrity of the electronic equipment within the Z.ONE*Ultra, it is critically important that a specific sequence be followed at all times, for turning ON or OFF system power. The sequences listed below should always be followed.*

5.6.4 Docking Scan Engine on *mini*Cart

STEPS:

1. Hold the Scan Engine centered (horizontally) and rearward above the docking plate on the miniCart.
2. Line up the tracks on the top surface of docking plate with the tracks on the bottom of the Scan Engine.
3. While resting flat on the docking plate surface, gently slide the scan engine directly towards you (forward), to engage it on the docking latches. Continue to slide the Scan Engine towards you, until a positive audible "click" is heard.

Figure 38: Scan Engine to *mini*Cart Docking

4. Open the I/O access door at the rear of the Scan Engine, and connect the docking connector cable assembly to the mating connectors on the Scan Engine

WARNING

To maintain the integrity of the electronic equipment within the Z.ONE*Ultra, it is critically important that a specific sequence be followed at all times, for turning ON or OFF system power. The sequences listed below should always be followed.*

5.6.5 Powering-ON the Z.ONE*Ultra*

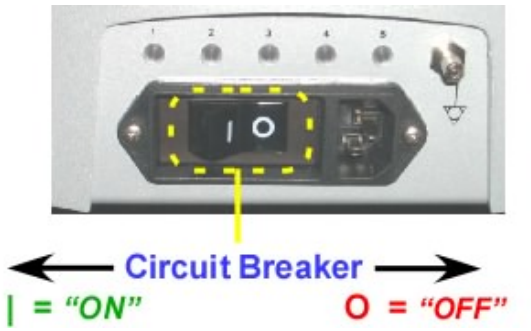
NOTE: The ***mini*Cart** receives direct AC power (no manual circuit breaker). Therefore anytime the main AC power cord is connected to an active outlet and the other end connected at the rear panel of the system, source power is active.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

5.6.5.1 SmartCart Power-ON

STEPS:

1. Make sure the AC Main Circuit Breaker on the SmartCart is in the "**1**" (***ON***, pushed in on the LEFT) position (see illustration below).



NOTE*:* *The SmartCart has the ability to be powered by AC or battery (IF the Z-PAK battery pack "Option" is ordered). When the SmartCart is fully charged the battery should allow for normal system operation for more than 1 hour.*

When the scan engine is docked into the SmartCart, its internal battery is subject to being charged. If the SmartCart is being AC powered the Scan Engine will utilize the main power supply, with source power coming from the AC input. If the SmartCart is running on the Z-PAK battery the scan engine will be charged using source power derived from the battery in the SmartCart.

2. Locate the power button on the front/left of the scan engine Scanner Deck. Press and release the On/Off button to power on the Z.ONE*Ultra*.

3. The Z.ONE*Ultra* will take less than a minute to complete the normal power on sequence.

5.6.6 Powering-OFF the Z.ONE*Ultra* System

NOTE: The ***mini*Cart** receives direct AC power (no manual circuit breaker). Therefore anytime the main AC power cord is connected to an active outlet and the other end connected at the rear panel of the system, source power is active.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

CAUTION

*To ensure the integrity of the stored User parameters, and system configuration, the Power ON/OFF button on the Scan Engine should always be used **FIRST**, as the method for shutting down a fully operating* Z.ONE*Ultra (SmartCart and Scan Engine) system.*

Failure to allow for a normal power-down sequence by the Scan Engine (such as by improperly pulling out the AC power cord or toggling the AC circuit breaker on the SmartCart while the Z.ONE*Ultra is still operating), may result in lost patient image data.*

5.6.6.1 *mini*Cart or Scan Engine (standalone) Power-OFF

STEPS:

1. Using the underside of your finger, gently ***press-and-release*** (do not "HOLD") the green-colored (rubber membrane) Power On/Off Switch at the back/left corner of the scan engine, to initiate the start of a power OFF sequence.

NOTE: *The system will NOT immediately power down, as the Scan Engine will perform a properly ordered shutdown sequence (taking approximately 10 seconds).*

2. A message should appear on the display within a few seconds, indicating the start of the normal shutdown sequence.

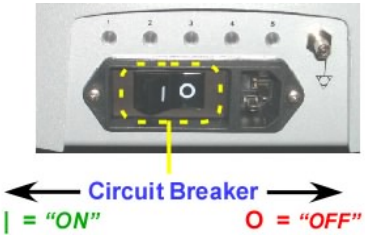
5.6.6.2 SmartCart Power-OFF

STEPS:

1. Locate the power button on the front/left of the scan engine dock plate. Press and release the On/Off button to begin the power down cycle on the Z.ONE*Ultra*.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- Normally the SmartCart's main AC circuit breaker power is left “ON”, even when the Z.ONE*Ultra* has been shutdown from normal use. However if the SmartCart is being transported the AC power can be turned OFF, by moving the circuit breaker to the “**0**” position (pushed in on the RIGHT), prior to disconnecting the AC power cord from the wall outlet



5.6.7 AC Power Adapter: Use & Operation

WARNING

There are no User or Field Service repairable components within the AC Power Pack. Any defective units should be returned to the Zonare factory for repair/replacement.

Standalone use (undocked from the SmartCart or *mini*Cart) of the Scan Engine normally utilizes a fully charged battery pack to power the unit. However to allow for extended standalone operation of the Scan Engine, an AC Power Pack is available from Zonare as an alternate power source. The output connector of the AC Power Pack is plugged into the DC power port on the rear of the Advanced Hardware Scan Engine.

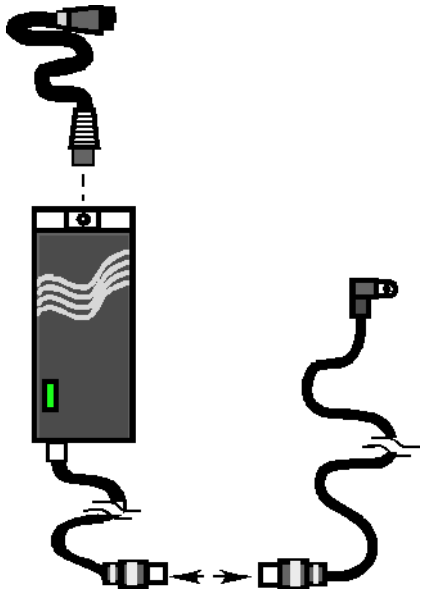


Figure 39: AC Power Adapter

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

STEPS:

1. Power off the Scan Engine, and ensure it is being used remotely (undocked) from the SmartCart or *mini*Cart
2. Plug the small connector of the DC Adapter Cable, into the mating socket on the DC power port, located at the back of the Scan Engine (inside the Rear I/O access door).
3. Connect the output connector of the DC Power Cable (out of the Power Supply) to the DC Adapter Cable's mating connector
4. Plug the AC Power Cable's female connector into the socket on the Power Supply
5. Plug the other end of the AC Power Cable into an active AC wall outlet
6. Inspect the Power-On indicator LED, on the Power Supply brick, to ensure power is on
7. Power on the Scan Engine and begin normal operation

5.6.8 2-Bay Battery Charger: Use & Operation

WARNING

There are no User or Field Service repairable components within the 2-Bay Battery Charger. Any defective units should be returned to the Zonare factory for repair/replacement.

The Lithium-Ion battery packs, used to power the Scan Engine during standalone (undocked) use, have expected charge retention of approximately 1 hour (during full-use of the Scan Engine). The battery pack is normally kept charged when the Scan Engine is docked within the SmartCart. However to prepare multiple battery packs for standalone Scan Engine use, or to recalibrate battery packs for maximum performance, a Zonare 2-Bay Battery Charger is available.

Part Number	Description
Z311	2-Bay Battery Charger, Domestic (120V) Model
Z312	2-Bay Battery Charger, International (220V) Model

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

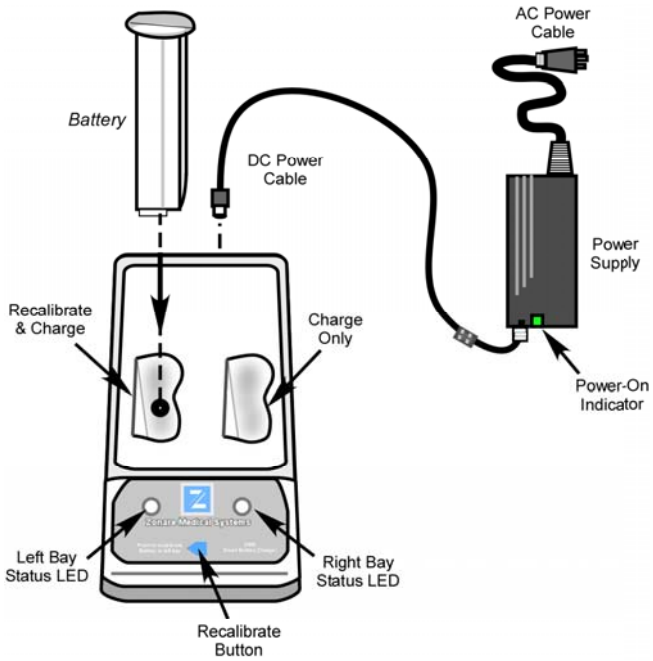


Figure 40: 2-Bay Battery Charger

5.6.8.1 "Recalibrating" Battery Packs

Recommended Intervals:

The Z.ONE*Ultra* battery pack contains Lithium-Ion battery cells as well as an electronic "fuel" gauge that keeps track of the charge and discharge cycles of the battery cells. During frequent charge/discharge cycles, it is possible for this fuel gauge to loose its synchronization to the actual charge remaining in the battery. When this happens, it is recommended to "Recalibrate" the battery pack. This process will re-synchronize the fuel gauge to the battery cells.

It is recommended that the "Recalibrating" process be performed on each battery pack at the following interval:

Usage Type	Recommended "Recalibration" Interval
• Battery packs heavily used in *standalone* (undocked) Scan Engine mode	Every 30 charge cycles (or approximately once per month, maximum)
• Battery packs used in Scan Engines primarily operated docked in SmartCart	Every 2 to 4 months

STEPS:

1. Connect the AC power cable to an active wall outlet, and connect the DC power cable between the power supply and the 2-Bay Battery Charger
2. Insert the battery pack into the LEFT bay of the 2-Bay Battery Charger (Note: Only the LEFT bay performs "Recalibration")
3. Press the "Recalibrate" button on the 2-Bay Battery Charger

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4. During the “Recalibrate” process, the left status LED flashes ORANGE. Once the “Recalibrate” process is completed, this same LED will intermittently flash between ORANGE and GREEN.

NOTE: - The “Recalibrate” process may require 14 hours to fully complete

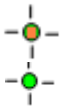
- The battery pack should NOT be removed prior to completion of the “Recalibrate” process, as the battery will be at an unknown level of charge

5.6.8.2 Charging Scan Engine Battery Packs

STEPS:

1. Connect the AC power cable to an active wall outlet, and connect the DC power cable between the power supply and the 2-Bay Battery Charger
2. Insert the battery pack into the EITHER bay of the 2-Bay Battery Charger
3. The charging cycle on the docked battery pack will automatically begin to execute
4. During the “Charging” process, the corresponding status LED flashes GREEN. Once the “Charging” process is completed, this same LED becomes solid GREEN.

NOTE: - The “Charging” process, in the two bays of the unit, is performed in a “sequential” fashion. If two battery packs are docked into the 2-Bay Battery Charger at the same time, the charger will perform the complete charging sequence on one battery pack, before starting the charging sequence on the second battery.

Status LED Condition	LED	Definition	
OFF		No battery pack detected in bay	
ORANGE – “Flashing”		“Recalibration” of battery pack in progress	
ORANGE/GREEN – “Flashing”		“Recalibration” complete (fully charged)	
GREEN – “Flashing”		“Charging” of battery pack in progress	
GREEN - Solid		“Charging” of battery pack complete	
ORANGE - Solid		“Standby” – Battery in bay, waiting to be charged	
RED – “Flashing” (Error)		**Error Cause**	**Resolution**
		- Foreign object in bays	Clear charging area
		- Battery pack defective	Replace battery pack
		- Excessive battery temp *[65°C / 149°F]*	Remove battery to cool

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

5.7 Transporting - Shipping the Scan Engine/Scan Module

STEPS:

1. If a transducer is attached to Scanner, disconnect it and store in an appropriately safe/protected manner
2. Undock the Scanner from the SmartCart/miniCart
3. Ensure that the Scanner is powered off
4. Remove the battery pack from the Scanner

CAUTION

– *To prevent possible damage to the unit, the battery must be REMOVED from the Scan Engine prior to transport or shipment.*

5. For shipment, ensure that the Scanner is packaged in a suitably protective storage container

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

6 BASIC SYSTEM CONFIGURATION

6.1 Basic System Configuration Procedures

- **Entering "INSTITUTION" (Hospital) Name**

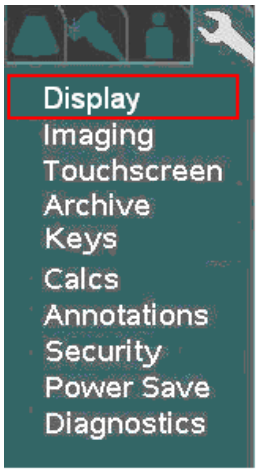
1. Using the page TAB button (or press the "SETUP" key on Enhanced style UI systems), advance menu screen to select **Tools** menu.

Menu Controls

TOOLS Menu

2. Using the Menu Control, arrow down to backlight **SYSTEM SETUP** selection, and press the SELECT button to bring up this menu.

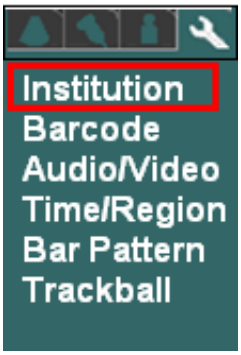
SYSTEM SETUP Sub-Menu



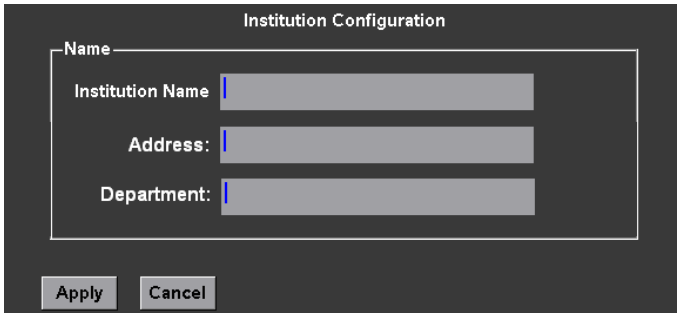
3. Within the **Display** selection, use the Menu Control to backlight **Institution** selection, press Select button to bring up this menu.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

DISPLAY Sub-Menu



INSTITUTION Sub-Menu

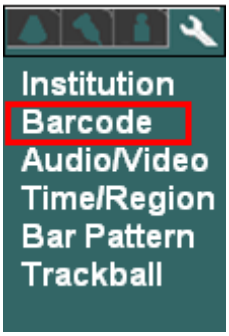


4. Using the alpha-numeric keyboard, enter Institution name (**Note**: Field is limited to 20 character positions)
5. Place the arrow cursor over the **APPLY** soft-button displayed in this menu, and press the **SET** key to save new settings.

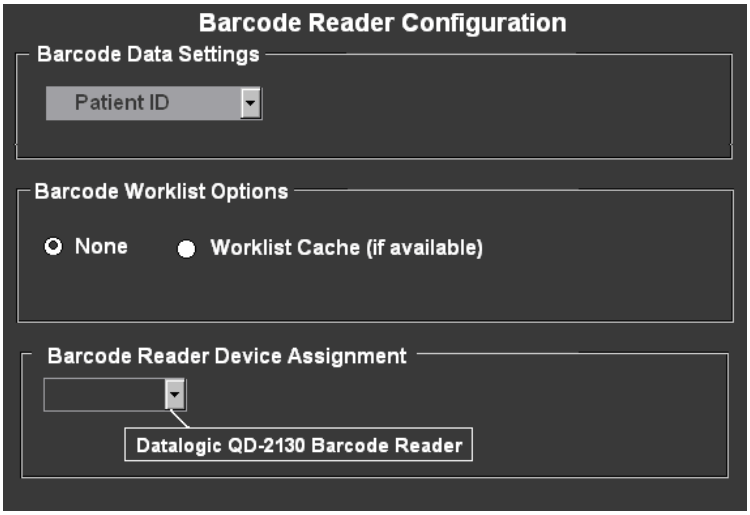
• Configuring "BARCODE" Setup

- Within the **Display** selection, use the Menu Control to backlight **Barcode** selection, press Select button to bring up this menu.

DISPLAY Sub-Menu



BARCODE Sub-Menu



1. Under the **Barcode Reader Device Assignment** pull-down menu, select the listed device corresponding to the active barcode reader currently attached to the USB ports on the Z.ONEUltra.
2. Under the **Barcode Data Settings** pull-down menu, select the desired parameter to be linked to for tracking patient exams:
   - **Patient ID**

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- **Accession Number**

3. IF the Z.ONEUltra is setup to interface with a DICOM Worklist server for populating patient exam scheduling, check the "**Worklist Cache**" option , within the **Barcode Worklist Option** selection.

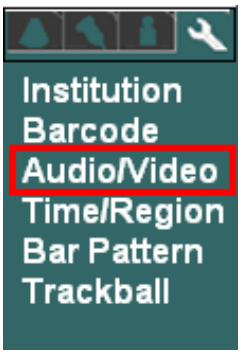
   Enabling this option will result in the Z.ONEUltra using the scanned-in barcode parameter (Patient ID, or Accession Number) for identifying the patient, to reference the cached Worklist data for auto-populating various fields in the Patient Information page.

4. Place the arrow cursor over the **APPLY** soft-button displayed in this menu, and press the **SET** key to save new settings.

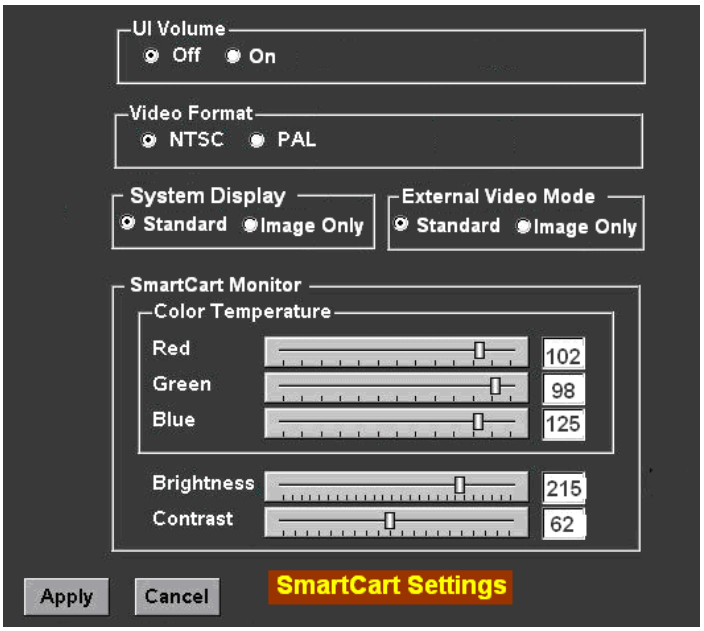
• Configuring "AUDIO/VIDEO" Setup

- Within the **Display** selection, use the Menu Control to backlight **Audio/Video** selection, press Select button to bring up this menu.

DISPLAY Sub-Menu



AUDIO/VIDEO Sub-Menu



"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- Select the desired A/V setup parameters from the menu. This is done by using the trackball to move the arrow pointer (in conjunction with the **SET** key), or using the TAB key on the alpha-numeric keyboard to advance to each successive field, and the **ENTER** key to make selections.

  Refer to Section 18.8.1 of this manual for details on the procedure and settings to be used in adjusting the Monitor on the SmartCart and miniCart (respectively).

- **System Display Mode**: (Applicable to SmartCart systems ONLY)

  This selection configures the format of the on-screen video. The selections allow for increasing the amount of screen area used for the display of the main ultrasound image. This enables increasing/decreasing the size of the image to suit the User. The two external video format options available are:

  - **Standard**: Standard image size with Dashboard and Thumbnail images displayed
  - **Image Only**: Expanded image size (**1280 x 1024**) occupying entire 19" display (no Dashboard/Thumbnails shown)

- **External Video Mode**: (Applicable to SmartCart systems ONLY)

  This selection configures the format of the digital video that will be produced at the external HDMI connector (DVI video), on the rear panel of the SmartCart. The output format is configurable to allow for matching the target peripheral device (external DVI monitor, etc). The two external video format options available are:

  - **Standard**: **1280 x 1024** format (entire screen of SmartCart) – No S-Video/Composite output on AVED box.
  - **Image Only**: **800 x 600** format (image area only) - Supports S-Video/Composite on AVED box.

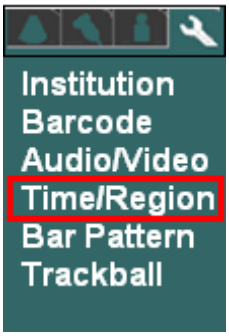
- Once all the desired values have been selected, place the arrow cursor over the **APPLY** soft-button displayed in this menu, and press the **SET** key to save new settings.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

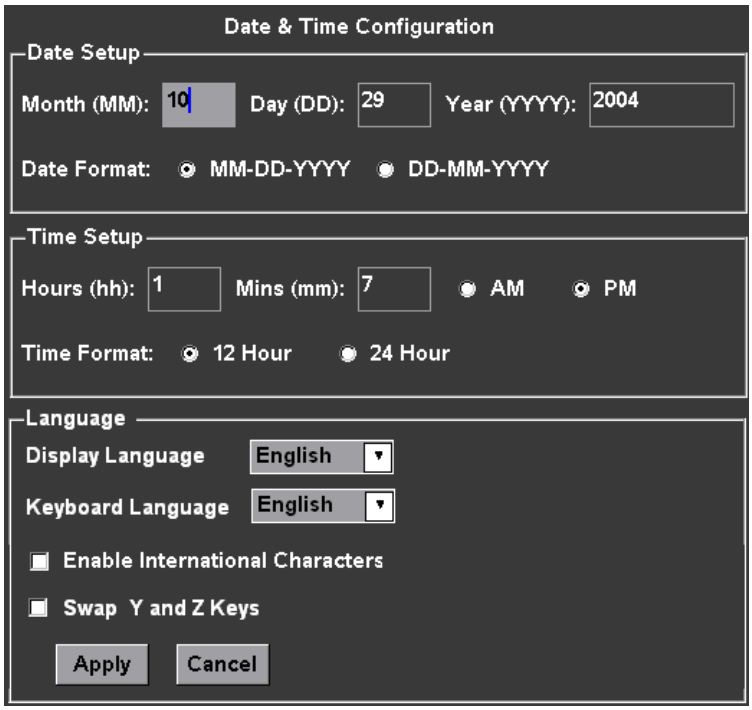
• Entering "TIME/REGION" Information

1. Within the **Display** selection, use the Menu Control to backlight **Time/Region** selection, press Select button to bring up this menu.

DISPLAY Sub-Menu



TIME (DATE) Sub-Menu



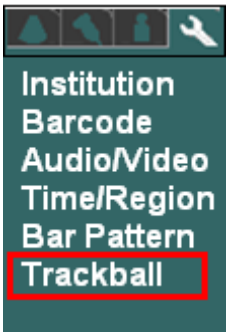
2. Using the alpha-numeric keyboard, enter in the current date/time information. The TAB key on the alpha-numeric keyboard is used for advancing to each successive field.
3. Place the arrow cursor over the **APPLY** soft-button displayed in this menu, and press the **SET** key to save new settings.

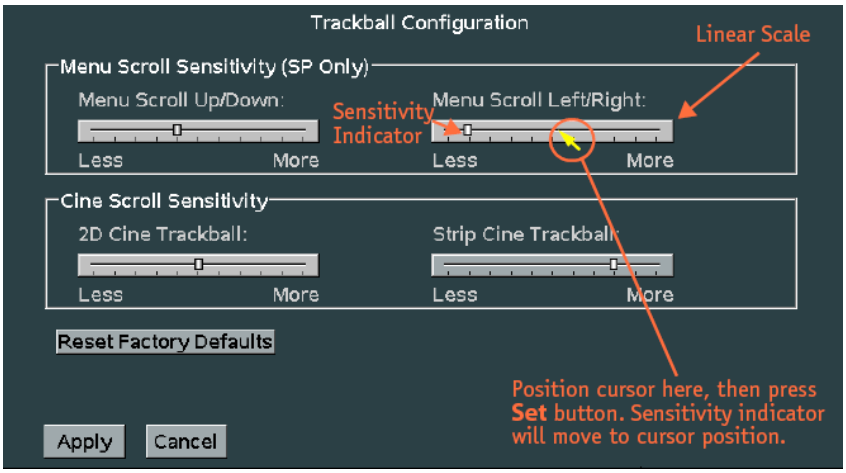
"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

• Entering "TRACKBALL" Configuration

1. Within the **Display** selection, use the Menu Control to backlight **Trackball** selection, press Select button to bring up this menu.

DISPLAY Sub-Menu **TRACKBALL Sub-Menu**





Cine Trackball Configuration: (Applicable to SmartCart systems ONLY)

This menu allows for configuring the behavior of the trackball to users preferences, independently for a variety of Cine modes. The configurable usages are as listed below:

Menu Scroll Sensitivity *(Dual "SET" key style User Interface style Carts ONLY)*

On the **SP Cart** (only), scrolling through menus and manipulating the settings for selected menu offerings can be performed using the trackball. On the regular SmartCart (full U/I) systems, the left/right-up/down **OMNI** control button is used for this same menu navigation process.

The following two configurable options allow for customizing the sensitivity of the trackball response during those menu operations on the **SP Cart**.

- **Menu Scroll Up/Down**:

Description: Threshold for speed of trackball movement by User when moving **up/down** through offered menu selections.

- **Menu Scroll Left/Right**:

Description: Threshold for speed of trackball movement by User when moving in a **left/right** direction, for altering the setting of a currently selected menu function.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Cine Scroll Sensitivity **(All SmartCarts)**

- **2D Cine Trackball**: (B-Mode or B-Mode/Color modes)

Description: Controls the number of frames that are advanced in response to each swept trackball movement by the User.

- **Strip Cine Trackball**: (M-Mode or Spectral Doppler modes)

Description: Controls the rate at which the time axis sweep is advanced in response to each sweep of trackball movement by the User.

Reset Factory Defaults::

Description: Restores all trackball setting in this menu, for Cine access, back to factory defaults.

• Configuring "IMAGING" Parameters

1. Using the page TAB button , advance menu screen to select **Tools** menu.

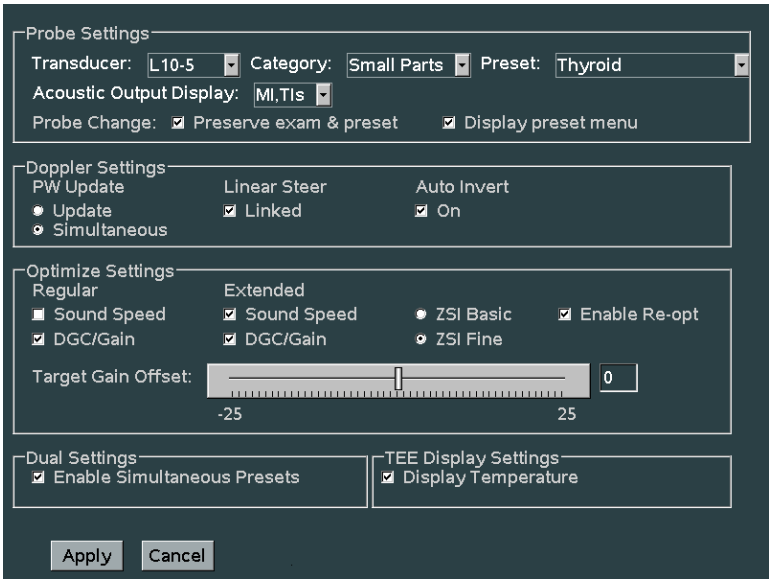
Menu Controls

TOOLS Menu

2. Using the Menu Control, arrow down to backlight **SYSTEM SETUP** selection, and press the SELECT button to bring up this menu, then select **IMAGING** sub-menu.

SYSTEM SETUP Sub-Menu **IMAGING Sub-Menu**

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



1. For each Transducer type in the pull-down menu, configure the power-up default application type and preset type that are desired.
2. Select the desired behaviors to occur post transducer change:

   - **Preserve Exam & Preset** — If checked, the system will retain the current Exam Type and Preset, when transitioning to selection of a different active transducer.

     If unchecked, the system will use the user assigned default Exam Type and Preset for each subsequent transducer, as it is activated.

   - **Display Preset Menu** — If checked, the OLED display panel will default to showing Exam Preset options in the windows, upon a transducer change.

     If unchecked, the OLED display panel will default to showing transducer selection options in the windows, upon a transducer change

3. Select the desired default Doppler settings.
4. Select the desired default Auto-Opt/ZST settings
5. Select the desired “DUAL” mode preset behavior setting
6. Select whether TEE temperature sensor reading is desired for on-screen display
7. Place the arrow cursor over the **APPLY** soft-button displayed in this menu, and press the **SET** key to save new settings.
8. Repeat the process above for all additional transducer types.

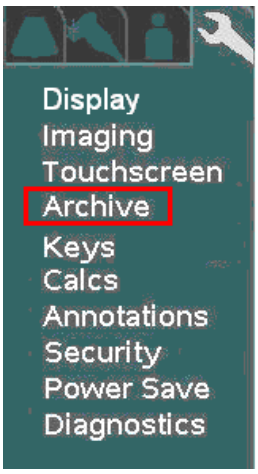
"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

7 ARCHIVE MENU FUNCTIONS

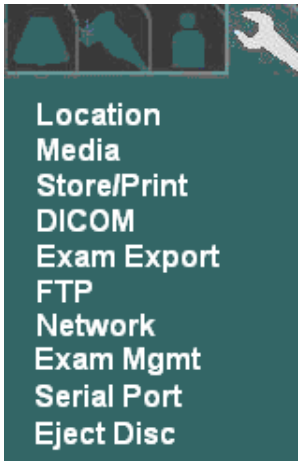
7.1 "Media" & "Store/Print" Button Configuration

1. Using the TAB button advance the menu screen to select **TOOLS**
2. Using the **Menu Control**, arrow down to backlight the **Archive** selection, and press the SELECT button to bring up this menu.

SYSTEM SETUP Sub-Menu



ARCHIVE Sub-Menu



In addition to configuration of the Archive functions, the following operations are also accessed under this menu path.

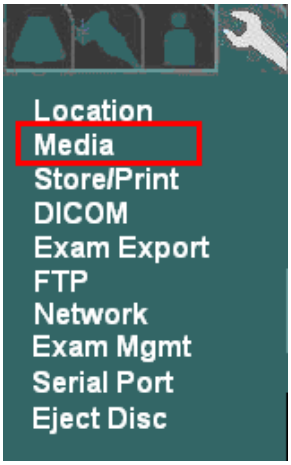
- LOCATION (site) specific configuration
- Media storage configuration
- Store/Print button configuration
- DICOM setups
- Exam Export
- FTP Store settings
- Network
- Exam Management
- Serial Port/USB report configuration
- Ejecting of DVD/CD in SmartCart

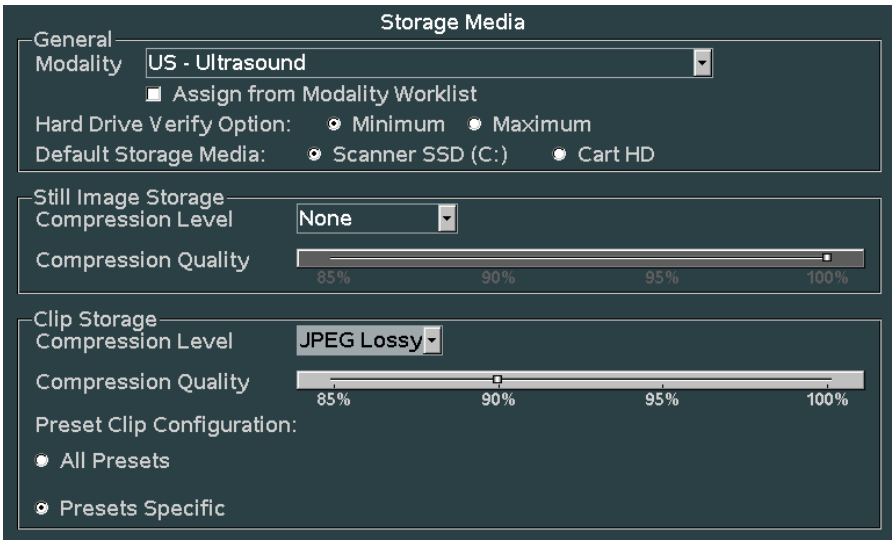
"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

• "MEDIA" Configuration

1. Within the **ARCHIVE** selection, use the Menu Control to backlight **Media** selection, press Select button to bring up this menu.

ARCHIVE Sub-Menu **STORAGE MEDIA Sub-Menu**





2. Make any changes desired to the settings for still and clip image compression, and defined modality. In most cases using the factory default settings will perform well on a customer system.

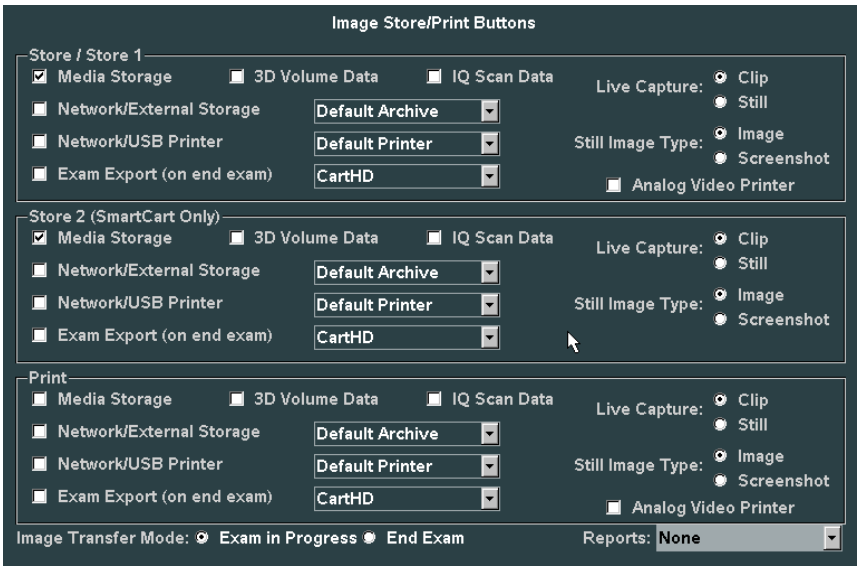
3. To save the new settings, select **APPLY** from the main menu, and press the **SET** key to save new settings.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

• "STORE/PRINT" Button Configuration

1. Within the **ARCHIVE** menu, use the Menu Control to backlight **Store/Print** selection, press Select button to bring up this menu.

ARCHIVE Sub-Menu **IMAGE STORE/PRINT BUTTONS Sub-Menu**



2. Based upon what functions are desired to occur when the PRINT and STORE buttons on the Z.ONE*Ultra* are pressed, configure the settings in this menu.
3. In order to have the ability to transfer all aspects of the image data captured using the 3D technology transducer, the "**3D Volume Data**" box must be checked for the corresponding STORE/PRINT button.
4. In order to have the ability to capture raw IQ data images, the "**IQ Scan Data**" box must be checked for the corresponding STORE/PRINT button.
5. Using the "***Live Capture***" option, the STORE/PRINT buttons can be configured to disable capture of "CLIP" storage, in the case that the button is pushed while the system is NOT in "Freeze" mode.
   - **Clip** — If checked, the system will capture live clips when the corresponding STORE/PRINT key is depressed while the system is in live imaging ("Freeze" not pressed) mode.
   - **Still** — If checked, the system will ONLY grab a single still frame, when the corresponding STORE/PRINT key is depressed while the system is in live imaging ("Freeze" not pressed) mode.
6. Using the "***Still Image Type***" option, the STORE/PRINT buttons can be configured to determine the amount of display area that is captured when pressed.
   - **Image** — If checked, only the ultrasound image window (800 x 600 area) is captured.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- **Screenshot** If checked, the entire screen area (1280 x 1024), including the dashboard and thumbnail area, is captured.

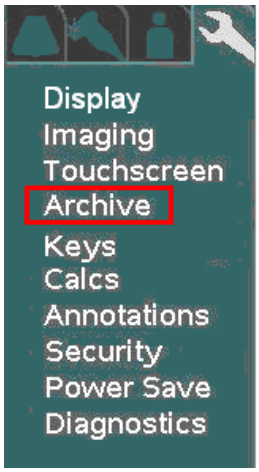
7. Configure the "***Image Transfer Mode***" selection to reflect the desired image transfer behavior on the Customer's system.
   - **Exam in Progress**: Results in each new DICOM image immediately being placed into the DICOM Queue for transfer to the target network/print device, each time the corresponding STORE/PRINT key is depressed.
   - **Exam Completed**: Images are buffered during each STORE key depression, and later placed as a group into the DICOM Queue for network/print transfer. The process for beginning the transfer of the images is automatically started when the Operator ends the current exam.
8. **Reports:** If SR (Structured Report) sending was enabled on the Network Store page for any PACS devices, select the desired target device in the pull-down menu.
9. To save the new settings, select **APPLY** from the main menu, and press the **SET** key to save new settings.

7.2 "Exam Export" Menu

The **EXAM EXPORT** menu allows for configuring the formatting (Compression, Color Model, etc) for images "**Exported**" to the target media device.

5. Using the page TAB button to advance menu screen to select **TOOLS** menu; then select **SYSTEM SETUP**, then select **ARCHIVE**.

SYSTEM SETUP Menu

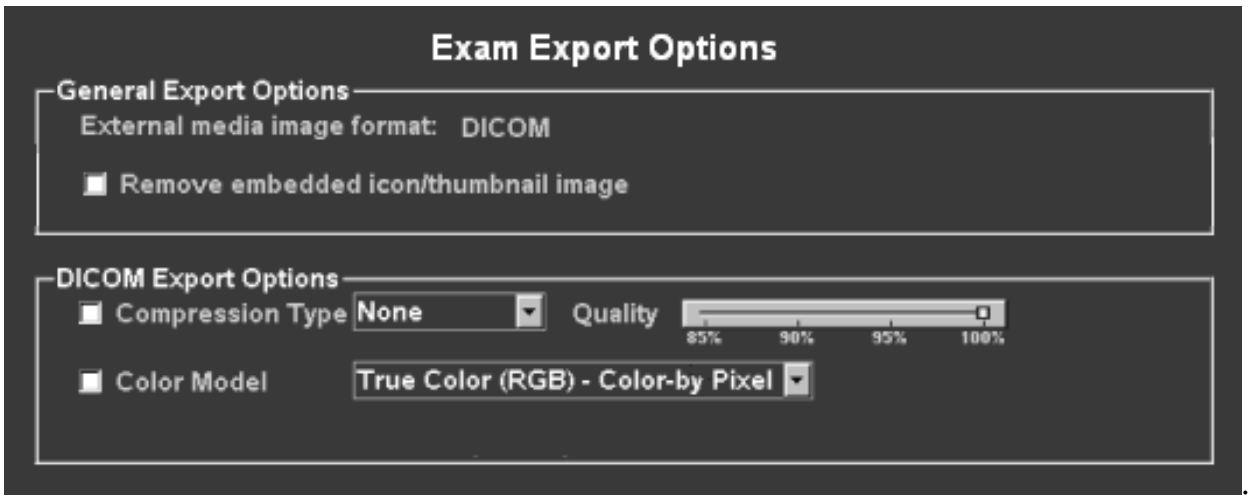


ARCHIVE Menu

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

6. Using the **Menu Control**, arrow down to backlight **EXAM EXPORT** selection, and press the SELECT button to bring up this menu.

EXAM EXPORT Sub-Menu



7. Configure the options settings to reflect the desired formatting for the target images upon export.

8. To save the new settings, select **APPLY** from the main menu, and press the **SET** key to save new settings.

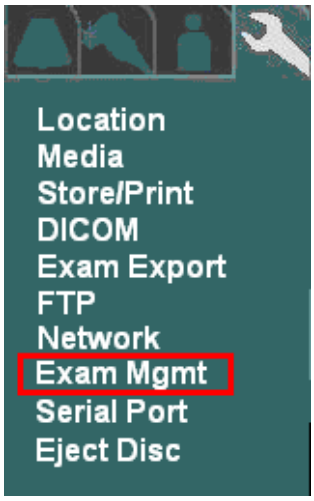
7.3 "Exam Management" Menu

The **EXAM MGMT** menu allows for configuring the functionality of the system when "**Restarting**" exams, and also provides access to low-level service functions for managing a variety of Archive media.

1. Using the page TAB button to advance menu screen to select **TOOLS** menu; then select **SYSTEM SETUP**, then select **ARCHIVE**.

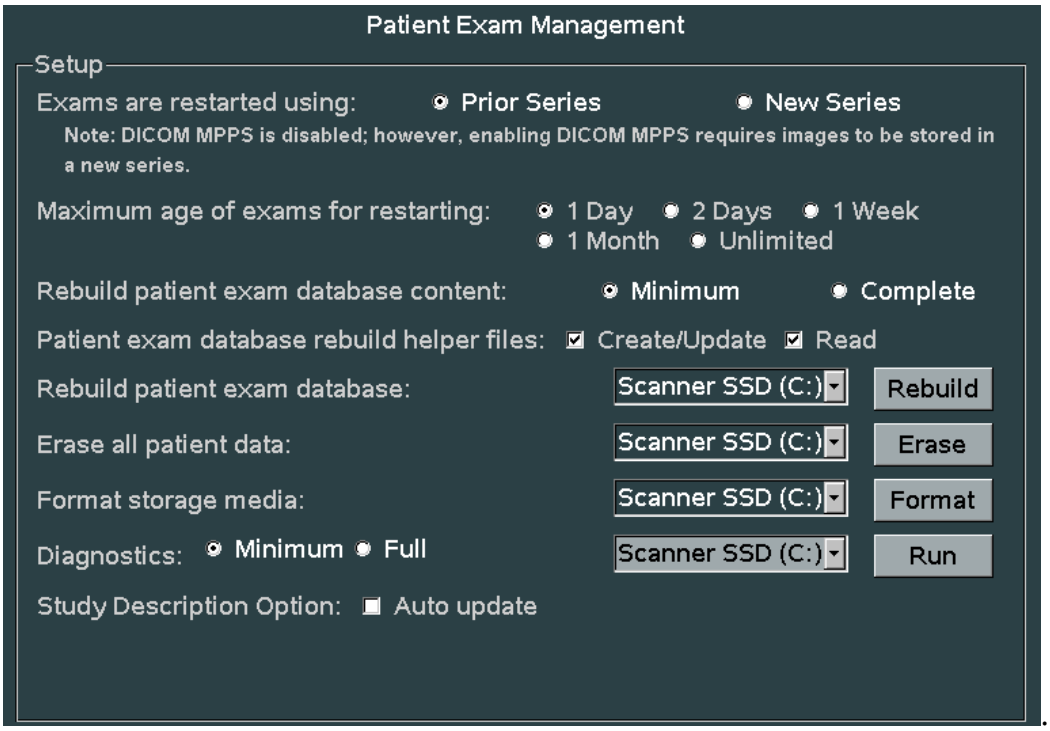
SYSTEM SETUP Menu **ARCHIVE Menu**

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



2. Using the **Menu Control**, arrow down to backlight **EXAM MGT** selection, and press the SELECT button to bring up this menu.

EXAM MGMT Sub-Menu


Patient Exam Management
Setup
Exams are restarted using: Prior Series New Series
Note: DICOM MPPS is disabled; however, enabling DICOM MPPS requires images to be stored in a new series.
Maximum age of exams for restarting: 1 Day 2 Days 1 Week 1 Month Unlimited
Rebuild patient exam database content: Minimum Complete
Patient exam database rebuild helper files: Create/Update Read
Rebuild patient exam database: Scanner SSD (C:) Rebuild
Erase all patient data: Scanner SSD (C:) Erase
Format storage media: Scanner SSD (C:) Format
Diagnostics: Minimum Full Scanner SSD (C:) Run
Study Description Option: Auto update

3. Configure the "***Exams Restarted Using***" selection to reflect the desired grouping of images upon restarting of a previous exam on the Customer's system.

   - **Prior Series**: Appends new images onto the series of images previously captured.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

IMPORTANT

*"**Prior Series"** selection is NOT available ("New Series" only) if the system has an active DICOM MPPS server enabled on the DICOM MPPS configuration page.*

- **New Series**: Creates a new series of images, utilizing only the Patient info from the earlier exam series.

4. Configure how many days prior to the current date that the Users will be allowed to "**RESTART**" (add/delete images) internally Archived patient exams.
5. Select the granularity desired when initiating patient exam database rebuild operations.
6. Using the **Menu Control**, arrow down to backlight **Apply** selection in the main menu, and press the SELECT button to save any exam "RESTART" configuration setup changes, and exit

---

ARCHIVE SERVICE FUNCTIONS:

WARNING

*Due to the deletion of the original (assumed corrupted) database file during the "**REBUILD PATIENT EXAM DATABASE**" process, it should be noted that Patient information updates made to initially started exams (i.e. changing Patient name info, etc, after the first image for a study has already been stored) will only be retained in post-rebuilt exam, if the "READ" option for the Helper files is "unchecked".*

- **Rebuild Patient Exam Database - Content:**

  This option allows for specifying the granularity of the exam database rebuild process that is initiated with the "REBUILD" menu selection below.

  ***NOTE**: The exam database content granularity selections (described below) does **not** have any effect (is not applicable) for rebuilds where the targeted device (via the pull-down selection) is an "External" media (i.e. USB memory sticks, CD/DVD, etc) device.*

  - **Minimum**: Rebuilds the study/exam table ONLY. Additional rebuilding, of the other tables, will occur later, as each individual study is accessed. (fastest)
  - **Complete**: Completely rebuilds all exam database tables, including exam/study table, series table, image/IQ/key image note table. (longer)

- **Patient Exam Database Rebuild "Helper" Files:**

  These settings allows for specifying how the database "Helper" files will be affected/utilized, when the "REBUILD" operation is performed.

  ***NOTE**: Default is both boxes selected ("checked"):*

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- **Read**: ☑ When **checked**: Tells the system to look for (read) the existence of a valid single "**HELPER**" file (most current patient/exam information for entire study) for each exam, and use its content exclusively for the database rebuild operation (fastest)

  ☐ When **unchecked:** The system will scan all files in each exam folder, looking for the most current data to be used for creation/update of the "HELPER" file. (longer)

- **Create/Update**: ☑ When **checked**: Instructs the system to generate a current "**HELPER**" file for each exam, during the execution of the "Rebuild" process. Once completed, subsequent "Rebuilds" should run much more quickly (as long as the "**READ**" option box is also checked)

  ☐ When **unchecked:** The system will not create or make any updates to existing "HELPER" files, when the "Rebuild" operation is performed.

- **Rebuild Patient Exam Database:**

  Clicking on this menu item begins the database "Rebuild" process. The "Rebuild" process is intended to be used in cases where exam access to the patient image ARCHIVE of the internal exam storage of the scan engine, or other archive media (Cart Hard Drive, remote USB media, CD/DVD, etc) becomes problematic.

  Selecting the "**REBUILD**" box will regenerate the database's index file (directory) and potentially resolve the problem. Select the desired media device, using the provided pull-down menu, prior to initiating the "Rebuild" process.

- **Erase All Patient Data:**

WARNING

*Initiating the "**ERASE**" function will completely delete ALL patient exams (all stored images) on the internal ARCHIVE storage of the Scan Engine.* ***DO NOT*** *perform this function unless the system's User has confirmed that all needed exams/images have been exported/transferred to another medium, or are no longer needed.*

Due to this operation performing individual "deletes", the "ERASE" operation may take an extended period of time to complete if the selected Archive media contains an extensive number of patient exams.

In extreme cases where the system is totally unable to access the ARCHIVE on either the scan engine or other media (HDD in Cart, etc), selecting the "**ERASE**" function will completely clear (erase) the following:

- All stored patient exams (images)
- All patient exams pending DICOM transfer in DICOM QUEUE (if C drive selected)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Select the desire media device using the provided pull-down menu.

- **Format Storage Media:**

NOTICE

*Initiating the "**FORMAT**" function will result in removing ALL of the contents of the target media device. This includes the following IF the "C" drive (Scan Engine/Scan Module internal storage) is selected:*

- *Patient exams*
- *System Logs*
- *DICOM Queue jobs*
- *Some Transducer file*

To prevent Users from accidentally performing this operation a "Service Password" prompt will appear prior to this "FORMAT" operation activating. Contact Zonare Technical Support in order to obtain the service password and assistance on this operation.

Due to the erasing of some transducer files, reloading of system software will be required after performing this "FORMAT" operation.

In extreme cases where the system is totally unable to access the internal storage media of the scan engine ("C" drive) or other media (HDD in Cart, etc), selecting the "**FORMAT**" function will completely reformat the media; erasing all contents. Due to the operation being a complete" **FORMAT**" where no individual files are accessed, it is completed very quickly.

Select the desire media device using the provided pull-down menu.

- **Diagnostics:**

The diagnostic function provides the ability to perform a database screening of the selected archive media device to verify its integrity. The media devices available for diagnostic testing are:

- **Scanner SSD** (C:) – Scanner Internal Archive Media
- **Cart HDD** (F:) – SmartCart Hard Drive

Two different options are offered to define the granularity level of the diagnostic testing.

☐ **Minimum**: .....Basic level diagnostic screening of target media device (quick)

☐ **Full**:.....Comprehensive screening of target media device (longer)

- **Study Description Option:**

☐ **Auto Update**

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

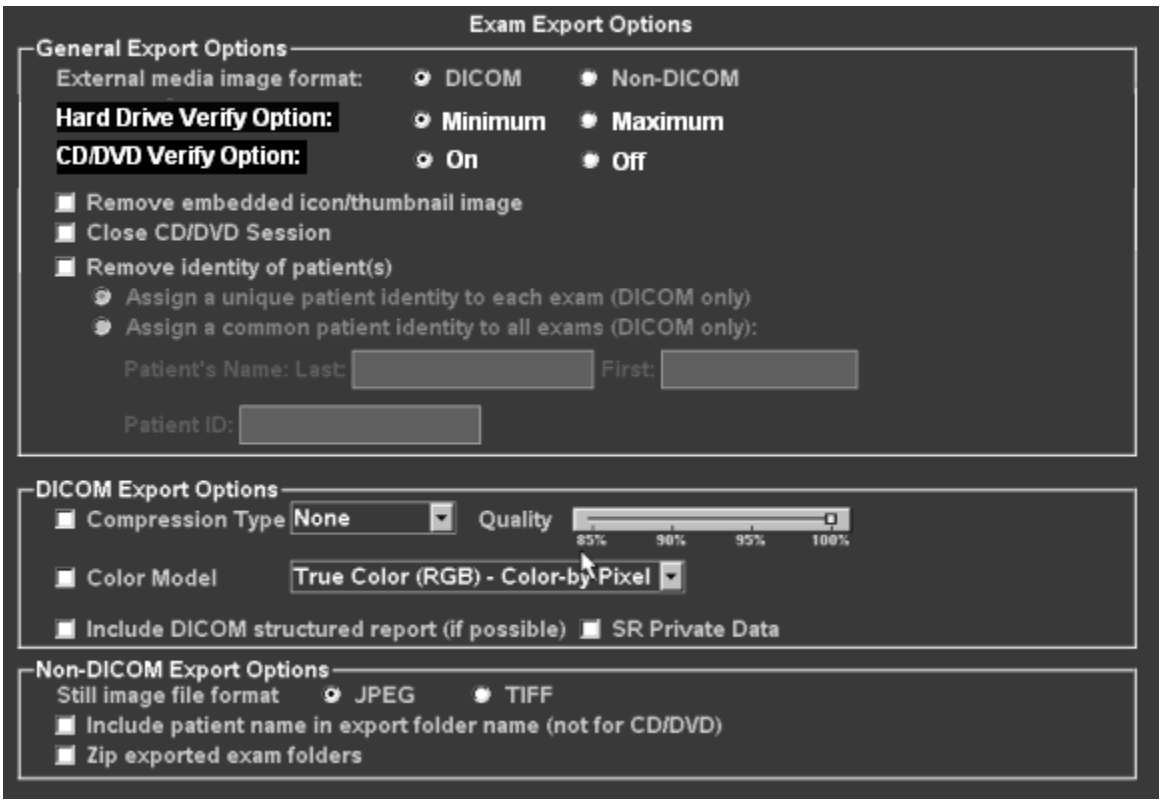
The “Auto Update” option being selected results in the “**Study Description**” field (DICOM Tag: **0008,1030**), on the Patient Demographics page, being automatically populated with source information provided from the DICOM Worklist server (if info is provided).

If no auto-populated source information is provided for this field (or this box is unchecked), the information can be manually entered by the User on the Patient Demographic page.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

7.4 Archive "Export" – OPTION menu

The EXPORT function on the ARCHIVE page includes a special **OPTIONS** page. This page allows for customizing the steps that will be performed, and the data formatting, that will occur during the export. The export options are as shown in the menu below:



- **General Export Options**
  - **External Media Image Format**:
    - ☐ DICOM: Exam data stored on output device in native DICOM format (may be re-imported later).
    - ☐ Non-DICOM: Exam data stored on output target device in a non-DICOM (cannot be re-imported or viewed on Zonare) format, as selected in non-DICOM export option area.
  - **Hard Drive Verify Options**:
    - ☐ Minimum: Basic level checksum verification only (fastest)
    - ☐ Maximum: Full filesystem data verification (longest)
  - **CD/DVD Verify Options**:

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- ☐ On: Comprehensive data validation operation at end of data export (longest)
- ☐ Off: No advanced data validation, but basic data checking still performed (fastest)

- **Remove embedded icon/thumbnail image**:

  When checked, the small icon/thumbnail images will be removed from all images

- **Remove Identity of Patients**:
  - ☐ Assign a unique patient identity to each exam (DCOM only):
  - ☐ Assign a common patient identity to each exam (DCOM only):

- **DICOM Export Options**
  - **Compression Type**:
    - ☐ Pull-down menu selection of different data compression (file size reduction) options
  - **Color Model**:
    - ☐ Pull-down menu selection of different option for color mapping data format

---

- **Non-DICOM Export Options**
  - **Still Image File Format Type**:
    - ☐ JPEG: Saves images as JPEG standard computer format
    - ☐ TIFF: Saves images as TIFF standard computer format
  - **Include Patient Name in Export Folder**:
    - ☐ When checked, the export folder naming convention will include patient name
  - **ZIP Exported Exam Folders**:
    - ☐ When checked, WINZIP compression of the final exam folder will be performed:

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

In extreme cases where the system is totally unable to access the ARCHIVE on either the scan engine or other media (HDD in Cart, etc), selecting the "**ERASE**" function will completely clear (erase) the following:

IMPORTANT

For use of DVD media type for Exports, only one brand/model of DVD media has been tested and approved to be compatible for use in the Zonare system. The approved DVD media type is as listed below:

- **Taiyo Yuden** brand DVD media ONLY!

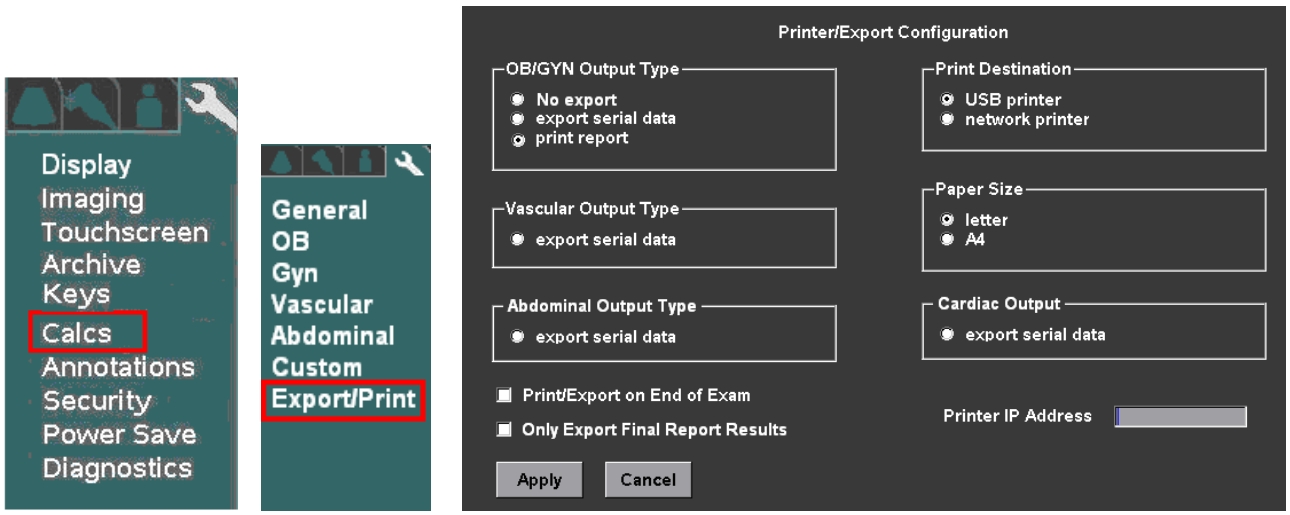
7.5 "Serial Port" Setup - (Export Calc Report Data)

The **SERIAL PORT** configuration menu allows for configuring the system to be able to "EXPORT" report data to 3rd-Party external report generator equipment, via a "**USB**" port connection on the **Z.ONE*Ultra*** product (*mini*Cart/SmartCart).

The three (3) *types* of Calc report data that can be exported, via the USB port (on a *mini*Cart/SmartCart), are as listed below. Configuring which report type(s) will be exported is performed on the **SYSTEM SETUP** ->**CALCS** -> **EXPORT/PRINT** menu.

- **OB/GYN** Calc Output
- **VASCULAR** Calc Output
- **CARDIAC** Calc Data

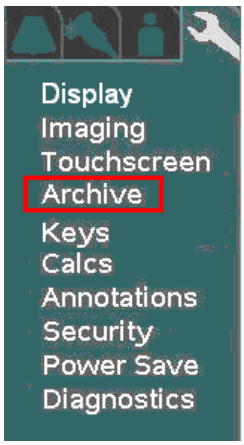
System Setup -> Calc -> Export/Print



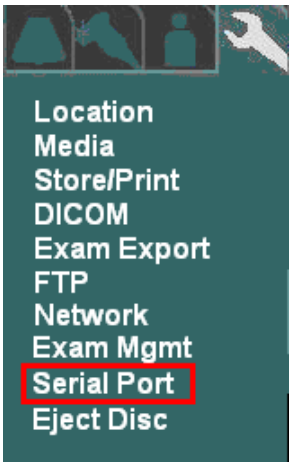
"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

1. Using the page TAB button to advance menu screen to select **TOOLS** menu; then select **SYSTEM SETUP**, then select **ARCHIVE**.

SYSTEM SETUP Menu



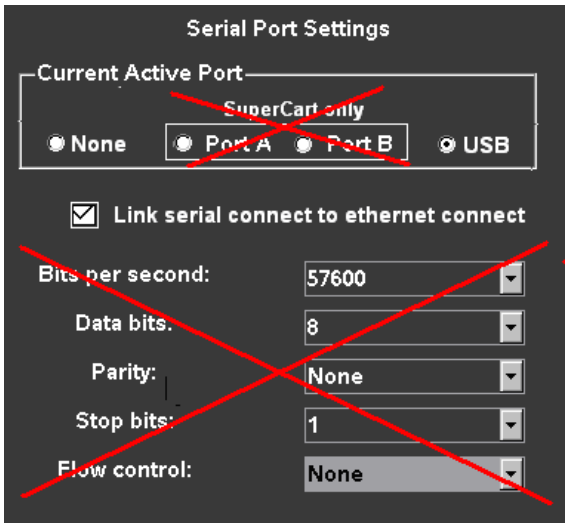
ARCHIVE Menu



2. Using the **Menu Control**, arrow down to backlight **SERIAL PORT** selection, and press the SELECT button to bring up this menu.

NOTE: The serial "***Port A***" and "*Port B*" selections, and all of the serial port setting selections (Bits per second, Parity, etc) in the menu are NOT applicable on the **Z.ONE*Ultra*** products (*mini*Cart/SmartCart). They appear only as a historical function to support the previous generation "***SuperCart***" product.

SERIAL PORT Sub-Menu



3. If desired, check the box to select the **USB** port as the target for EXPORT function of OB/GYN report data.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4. If desired for report data to be exported in sync with DICOM image transfers to the PACS system over the network, check the box for “Link Serial Connect to Ethernet Connect”.
5. Using the **Menu Control**, arrow down to backlight **Apply** selection in the main menu, and press the SELECT button to save the serial port configuration setup, and exit

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

8 DICOM CONFIGURATION

8.1 "DICOM" Configuration Overview

Prior to installation of the Z.ONE*Ultra* at any medical facility utilizing a **DICOM** network environment, a "Pre-Install Survey Form" (ZONARE P/N: F00044) should have been completed. This form is used for obtaining, in advance, detailed networking and **DICOM** configuration values (IP addresses, AE Titles, etc.) from the ***IT/PACS System Administrator*** at the facility. These site-specific values/parameters are required prior to programming the entries in the DICOM configuration menus on the Z.ONE*Ultra*.

A copy of this "Pre-Install Survey Form" is included on the following pages, as a backup resource.

IMPORTANT

Once all of the DICOM parameters have been configured into the required DICOM setup menus, it will be necessary to power down and reboot the Z.ONE*Ultra* *in order to initialize the new network connections with the target devices.*

Z.ONE Network Address Info Requirements:

The following information, defining the Z.ONE*Ultra*'s identity on the local network at the medical facility and must be assigned ***by the facility's IT/PACS Network Administrator***, prior to beginning the setup of the **DICOM** configuration menus on the Z.ONE*Ultra*.

Definition	Assigned Value	*Example Only*
• Z.ONE*Ultra* (IP Address):	_ _ _ . _ _ _ . _ _ _ . _ _ _	*10.94.1.105*
• Z.ONE*Ultra* (Gateway Address):	_ _ _ . _ _ _ . _ _ _ . _ _ _	*10.94.1.1*
• Z.ONE*Ultra* (Subnet Mask):	_ _ _ . _ _ _ . _ _ _ . _ _ _	*255.255.255.0*

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

8.2 "DICOM" Configuration Parameter Definitions:

The table below provides some guidance regarding the type of information required for the DICOM configuration of the various menus ("**General**", "**Printers**", **Network Store**", "**MPPS**" and "**Worklist**") on the Z.ONE*Ultra*.

DICOM Configuration Parameters:	Definition:
AE Title e.g., "Zonare1"	The official "name" (*Application Entity*) assigned to the Z.ONE*Ultra* (by the network administrator) to identify it to the network.
Association Acceptor	Configuration options to enable cases where the Z.ONE is desired to be configured to serve as a DICOM host for accepting DICOM association requests and store requests from other DICOM devices
Color Model	Defines the method that will be used (Grayscale, RGB color, etc.) by the receiving device (DICOM PACS system) for interpreting the different bit level values of the data, within the transferred images Selections include: - Palette Color - True Color (RGB) - Color by Pixel - True Color (RGB) - Color by Plane - Grayscale (Monochrome2)
Compression – None – RLE Lossless – JPEG Lossy	Enables the ability to compress image files for the purpose of reducing file size and transfer times. RLE Lossless automatically reduces the size of the transferred image, yet retains all source content. Provide the highest level of image file size reduction (compression) of all the options. User selectable "Quality" setting (between 85-100%) determines resultant file size.
Date Range	Specify the number of days back (Today, 2, 7, All) that the DICOM worklist will reference scheduled examinations.
Gateway IP Address	A designated TCP/IP address (i.e 10.1.1.254) that is required in cases where the Z.ONE*Ultra* is to be connected to target devices that are outside the primary host network (FTP remote access, for example).
ICON Image	A sub-sampled (miniature size) version of the image created for each patient image on the Z.ONE*Ultra*. Options are to either *retain* or *remove* these images from DICOM image transfers to the target device. (default is "*retain*")
IP address	Internet Protocol address. A unique Internet address for devices attached to an IP network (TCP/IP network).
Keep Alive Timeout	Specify the duration (in seconds) that an established DICOM connection will be maintained, after completion of the last transfer.
Key Image Note/Key Object Selection Document	Specifies the sending of Key Image Note electronic "Post-It" note info, as Key Object Document content during the DICOM-DICOM SR transfers to the PACS system.
Limit by Modality – None	Filtering by modality (US, CT, MRI, et cetera) of scheduled patient examination data generated by the Worklist server. Set according to department requirements.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

DICOM Configuration Parameters:	Definition:
– US (ultrasound) – 50+ additional options: (see list of selections)	None: Show entries for *all* modalities. US: Show entries for ***ultrasound*** exams only. The following additional modality filter (limit) settings are available for selection: Selections – AU, BI, CD, CR, CT, DD, DG, DX, ECG, EPS, ES, FID, GM, HC, HD, IO, IVUA, KO, LS, MG, MR, NM, OP, OT, PR, PT, PX, REG, RF, RG, RTDOSE, RTIMAGE, RTPLAN, RTRECORD, RWV, SM, SMR, SR, ST, TG, US, XA, XC
Log Level	Defines the level of detail information that will be displayed in the DICOM Queue.
Maximum entries cached Enter a number between 0 and 999	Set according to department requirements. A higher number provides access to more scheduled exams, but increases the time required to search for the exam of interest.
Minimum/Maximum Film Density	For defining Minimum/Maximum density of images on film. Value entered is expressed in hundredths of OD (optical density). A value entered of 150, corresponds with 1.5 OD. Typical acceptable values to be entered are 000-399, with 020 (for "Min") and 300 (for "Max") being a potential starting point.
Network Type	Allows for manual or auto setup of network speed and duplex operational state. Selections include: Auto-Negotiate, 100MB/Full-Duplex, 100MB/Half-Duplex, 10MB/Full-Duplex, 10MB/Half-Duplex
Nickname e.g., "Prep Room Printer"	An informal name to identify the device to users in the department. This name is typically assigned in the department.
Network Usage Type	Defines the interval at which DICOM images will be transferred over the network to the PACS storage device. Either immediately upon each press of STORE ("Exam in Progress"), or at the termination of the current examination ("Exam Completed"). - Exam In Progress - Exam Completed
No Color	If selected, images that are captured when the Z.ONE*Ultra* is being operated in modalities where no "Color" is present (B-Mode, PW Doppler, M-Mode), will be transferred to the receiving DICOM device (Network Store system) as "**Grayscale-Monochrome2.** Despite this "***No Color***" selection being active, all images captured while in Color Doppler mode will still be transferred to PACS using the color map selected in the *Color Model* field.
PDU Receive/Send Size	The size (in bytes) of the basic data packets (PDU: Process Data Unit) that will be trasferred during receive and transmit operations. (default is 16384 = 16K)
Pixel Spacing	Adds ability to assign CT/MR-specific pixel spacing to ultrasound images sent to PACS, to allow for calibrating pixels to millimeters for measurements.
Polling Interval (minutes) – None – choose minutes	The frequency of automatic updates to the worklist. A short polling interval may impact system performance. Choose a preferred interval; or choose **None** to update the worklist only on demand.
Port number	The TCP/IP port number that is being used by the DICOM device connected to the Z.ONE*Ultra*. Default port value is 104.
Queue Timeout (sec)	The maximum amount of time that a DICOM job will remain active in the queue, before it times out.
Queue Start Type	Defines whether the start of jobs in the DICOM queue will be performed *automatically* or started *manually*.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

DICOM Configuration Parameters:	Definition:
Reconciliation	For exams ***NOT YET*** sent to PACS. Specifies that the system will interrogate the patient information from the last stored image, prior to sending that exam to DICOM PACS device. For images in that exam having differing information, the system will reconcile (correct) those values in the DICOM headers prior to sending.
Release Association	Specifies whether to release the DICOM association (communications link between the Z.ONE*Ultra* and the DICOM storage device) after each individual image is transferred or maintain it until the entire exam is completed.
Remove Attributes	Specifies any DICOM attributes (i.e. Soft Tissue Thermal Index) that are desired to be removed from the DICOM image header transferred with stored images. This function provided to allow compatibility with all DICOM target devices.
Scheduled Station AE Title	Identity (Application Entity Title) assigned to the Zonare ultrasound system, for use in filtering patient exam scheduling data provided by the Worklist server. Value to be provided by PACs Admin, to meet department requirements.
SR Emulation - (*special license req*.)	Special feature (license file option required) for forced populating three fields in DICOM header for SR output to enable acceptance by Siemens "SYNGO" PACS - (0018,1020) Software Version(s) -- PMS5.1 Ultrasound iU22_4.0.1.1 - (0020,000E) Series Instance UID -- 1.2.840.113663.1500.1.xxx - (0008,0018) SOP Instance UID -- 1.2.840.113663.1500.1.xxx
SR Private Data	Include raw serial calc data as DICOM "Private Element" content, with SR data exported
Station Name	The user-friendly Host name that will be assigned to the Z.ONE*Ultra* for identification on the local network. Should be provided by the Network Administrator.
Subnet Mask	The number of bits (within the 24-bit IP Address) that will be used for defining the "Network" portion vs. the "Host" portion of the TCP/IP address.
TCP Timeout (sec)	The maximum duration (in seconds) of waiting time that will be allowed for completion of transfers over the network. Set according to anticipated network type/ speed.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

8.3 Z.ONE*Ultra* Pre-Install Survey Form *(Sample Only)*

DICOM Connectivity Type at Customer Site: ***(Check boxes below, as applicable:*** ***Required)***

DICOM" Network Store"	**DICOM" MPPS"**	**DICOM" Printer Only"**	**DICOM" Worklist"**	**No DICOM**

Network Setup Parameters

Level	Parameter Name	User Site Value/Setting	Default / Special Info
Required	TCP/IP Address acquisition method	**Obtain Automatically (DHCP)** Use Specified	*Obtain Automatically*
Required	Use Specified (IP Address, if fixed)		
Required	Gateway IP Address (IP Address, if fixed)		
Required	Subnet Mask (IP Address, if fixed)		
Required	Ethernet Media Type (Speed/Duplex)	**Auto Select** 100MB/Full-Duplex 100MB/Half-Duplex 10MB/Full-Duplex 10MB/Half-Duplex	*Auto Select*
Service	Wireless Bridge (Service-Support)	• IP Address: _____ • Username: _____ • Password: _____	*Service option*

General System / DICOM Setup Parameters

Level	Parameter Name	User Site Value/Setting	Default / Special Info
User option	Application (AE) Title – (Zonare System)		*ZONARE*
User option	Station Name – (Zonare System)		*ZONARE*
User option	TCP Timeout (sec.)		*30*
User option	Queue Timeout (sec.)		*120*
User option	Queue Start Type	**Automatic** Manual	*Automatic*
User option	Keep Alive Timeout (sec.)		*3600*
User option	Association Acceptor	☐ Port *104* ☐ Storage	☐ ☐ *both unchecked*
User option	Log Level	Selections: (**Normal**, None, Debug)	*Normal*

Printers (DICOM) Setup Parameters (if applicable)

Level	Parameter Name	User Site Value/Setting	Default / Special Info
Required	Nickname - (Printer)		
Required	Application (AE) Title – (Printer)		
Required	IP Address (Printer)		
Required	Port Number		*104*
User option	Max PDU Receive Size		*16384*
User option	Max PDU Send Size		*16384*

SAMPLE

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

User option	Color Mode	**Color** Grayscale	*Color*
User option	Number of Copies		*1*
User option	Print Priority	Low **Med** High	*Med*
User option	Image Display Format	Selections: (**2x2**, 1x1, 1x2, 2x1, 2x3, 3x2, 3x3, 3x4, 3x5, 4x3, 4x4, 4x5, 4x6, 5x4, 5x5, 5x6, 5x7)	*2x2*
User option	Medium Type	Default Low **Medium** High	*Medium*
User option	Film Orientation	Default **Portrait** Landscape	*Portrait*
User option	Film Size	Selections: (Default, **8x10**, 8.5x11, 10x12, 11x14, 11x17, 14x14, 14x17, 24cm x 24cm, 24cm x 30cm, A4, A3	*8x10*
User option	Trim	Default **Yes** No	*Yes*
User option	Min Film Density	Typical acceptable *value range – (000-399)*	
User option	Max Film Density	Typical acceptable *value range – (000-399)*	
User option	Border Density		*Black*
User option	Empty Image Density		*Black*
User option	Magnification Type	None Replicate Bilinear **Cubic**	*Cubic*
User option	Smoothing Type		

Network Store (DICOM) Setup Parameters (if applicable)

Level	Parameter Name	User Site Value/Setting	Default / Special Info
Required	Nickname - (PACS Server)		
Required	Application (AE) Title - (PACS Server)		
Required	IP Address - (PACS Server)		
Required	Port Number		*104*
User option	Max PDU Receive Size		*16384*
User option	Max PDU Send Size		*16384*
User option	Color Model	Palette Color Grayscale True Color (RGB) – Color-By-Pixel True Color (RGB) – Color-By-Plane	*Palette Color*
User option	No Color	No Color	☐ *unchecked*
User option	Remove Attributes	Selections: (iICON Image Sequence, Sequence of Ultrasound Regions, Output Power, Mechanical Index, Bone Thermal Index, Cranial Thermal Index, Soft Tissue Thermal Index, Soft Tissue Focus Thermal Index, Soft Tissue Surface Thermal Index, Depth of Scan Field,	*ICON Image Sequence*
User option	Pixel Spacing	Assign non-US pixel spacing from 2D US region	☐ *unchecked*
User option	Reconciliation	Reconcile patient/exam information - Rewrites Patient Info into all images in exam, based on last frame stored, prior to re-send to PACS	☐ *unchecked*

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

User option	Object Type	Still/Single-Frame Image Cine/Multi-Frame Image IQ Scan/Raw Data SR Document SR Private Data SR Emulation *(special option)* Key Image Note/Key Object Selection Document	*Always checked (grayed)* ☐ *unchecked* ☐ *unchecked* ☐ *unchecked* ☐ *unchecked* ☐ *unchecked*
User option	Release Association	After storing each image in the exam After storing the entire exam	*After storing each image*

MPPS (*Modality Performed Procedure Step* - DICOM) Setup Parameters (if applicable)

Level	Parameter Name	User Site Value/Setting	Default / Special Info
Required	Nickname - (MPPS Server)		
Required	Application (AE) Title – (MPPS Server)		
Required	IP Address (MPPS Server)		
Required	Port Number		*104*
User option	Max PDU Receive Size		*16384*
User option	Max PDU Send Size		*16384*

Worklist (DICOM) Setup Parameters (if applicable)

Level	Parameter Name	User Site Value/Setting	Default / Special Info
User option	Nickname - (Worklist Server)		
Required	Application (AE) Title - (Worklist Server)		
Required	IP Address – (Worklist Server)		
Required	Port Number		*104*
User option	Max PDU Receive Size		*16384*
User option	Max PDU Send Size		*16384*
User option	Scheduled Start Date	**Today** Last 2 Days Last 7 Days All	*Today*
User option	Scheduled Modality	**US** None Selections – Circle one if desired: (AU, BI, CD, CR, CT, DD, DG, DX, ECG, EPS, ES, FID, GM, HC, HD, IO, IVUA, KO, LS, MG, MR, NM, OP, OT, PR, PT, PX, REG, RF, RG, RTDOSE, RTIMAGE, RTPLAN, RTRECORD, RWV, SM, SMR, SR, ST, TG, US, XA, XC)	*US*
User option	Scheduled Station AE Title		
User option	Automatic Query Type (Minutes)	Selections: (1, 3, **5**, 10, 15, 30, 60, Disabled)	*Every 5 Minutes*
User option	Maximum Entries Cached		*200*
User option	Filter Cached Entries	**Filter Cached Entries**	*On (checked)*
User option	Query on Display	Query on Display	*Off (unchecked)*

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Media – Storage Setup Parameters

Level	Parameter Name	User Site Value/Setting	Default / Special Info
User option	**General: Modality**	Selections – Circle one if desired: (AU, BI, CD, CR, CT, DD, DG, DX, ECG, EPS, ES, FID, GM, HC, HD, IO, IVUA, KO, LS, MG, MR, NM, OP, OT, PR, PT, PX, REG, RF, RG, RTDOSE, RTIMAGE, RTPLAN, RTRECORD, RWV, SM, SMR, SR, ST, TG, **US**, XA, XC)	*US*
		Assign from Modality Worklist	☐ *unchecked*
User option	**Still** Image Store: **Compression Level**	**None** RLE Lossless JPEG Lossy	*None*
User option	**Still** Image Store: **Compression Quality** *(active only IF "**JPEG Lossy**" selected)*	(85% - 100% selectable)	*n/a*
User option	**Cine** Image Store: **Compression Level**	None RLE Lossless **JPEG Lossy**	*JPEG Lossy*
User option	**Cine** Image Store: **Compression Quality** *(active only IF "**JPEG Lossy**" selected)*	(85% - 100% selectable)	*90 (%)*

Other DICOM/Network Related Behavior - Settings

Level	Parameter Name	User Site Value/Setting	Default / Special Info
User option	MPPS Destination	Enable **Disabled**	*Disabled*
User option	Worklist Destination	Enable **Disabled**	*Disabled*
User option	Image Transfer Mode	**Exam In Progress** Exam Completed	*Exam In Progress*

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

8.4 "DICOM" Configuration Procedure - Menus

NOTE: Refer to the "Survey Form" (on the previous pages), for detailed information of all the values that are offered in the Z.ONE*Ultra* menus, for selection within the various fields, in each of the following configuration screens.

- **Site Specific " LOCATION" Configuration**

The "**Location**" option supports cases where a User has a need to physically move their Z.ONE*Ultra* system from one facility (location) to another on a regular basis. This function addresses cases where this movement includes connecting to a unique network at each location, for sending to DICOM devices, and those network connections consist of different IP addresses and/or target DICOM devices.

The "Location" feature allows for simultaneously having multiple configurations saved on the Z.ONE*Ultra*, and the ability to quickly toggle between those settings my merely changing "Locations" in the menu. The parameters that are saved as a unique "Location" using this feature are as listed below:

- **System Setup->Display->Institution** page settings (Hospital Name)
- **System Setup->Archive->Network** page settings (IP Address, Gateway, Netmask)
- **System Setup->Archive->DICOM->General** page settings (AE Title, etc)
- **System Setup->Archive->DICOM->Worklist** page settings (***Enabled*** server selection)
- **System Setup->Archive->Store/Print** page settings for devices using Print/Store buttons
- **System Setup->Archive->Serial Port** page settings (Calc report data via USB port)

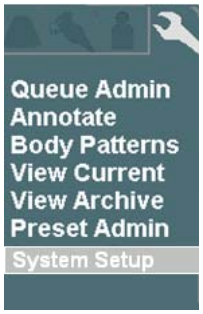
1. To setup a new "Location", first go to the setup pages listed above, and configure all of the settings (IP Addresses, AE Titles, etc) applicable to the new site location.
2. Once all the Network/DICOM/Store-Print settings have been entered in these other menus, perform the following steps to capture those settings as a new "Location".

---

3. Using the page TAB button to advance menu screen to select **TOOLS** menu

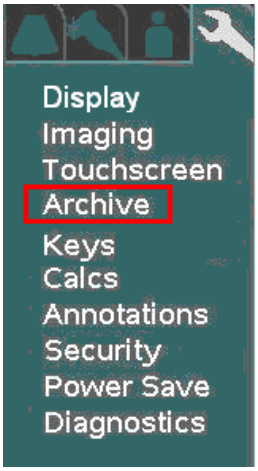
TOOLS Menu

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

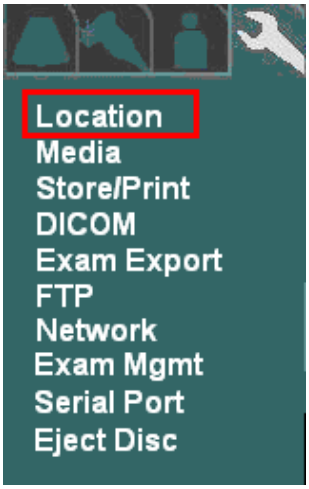


4. Using the **Menu Control**, arrow down to backlight **SYSTEM SETUP** selection, and press the SELECT button to bring up the main menu, then select the ARCHIVE option, followed by the LOCATION option.

SYSTEM SETUP Sub-Menu

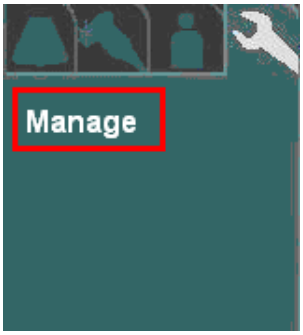


ARCHIVE Sub-Menu



5. Within the **Location** selection, use the Menu Control to backlight **Manage** selection, and press the SELECT button to bring up this menu.

LOCATION Sub-Menu

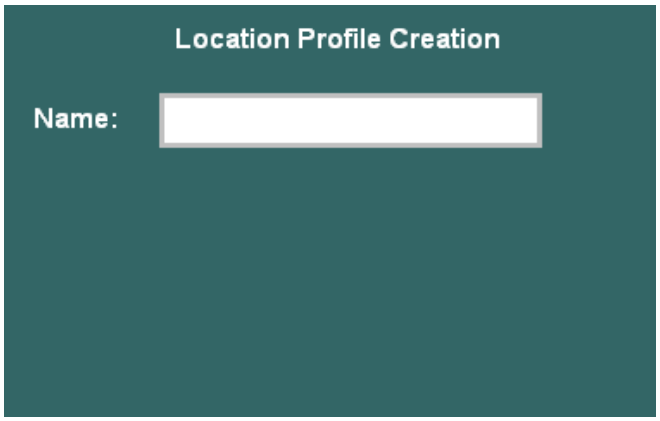


MANAGE Sub-Menu

6. Using the **Menu Control**, arrow down to backlight **CREATE** selection, and press the SELECT button to bring up the location creation page.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

CREATE Sub-Menu



7. Enter in the desired user-defined name to be used for the new “Location”
8. To save the new Location, select **APPLY** from the main menu, and press the **SET** key
9. Open each of the configuration pages (Network, DICOM General, etc) for parameters that are savable under the Location manager, and enter in the desired settings. .

• DICOM” GENERAL” Configuration

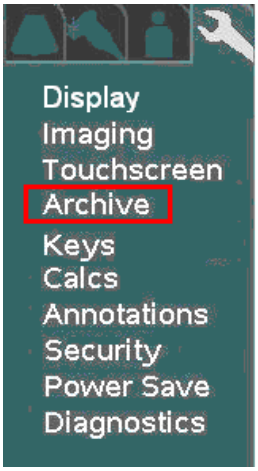
1. Using the page TAB button to advance menu screen to select **TOOLS** menu.

TOOLS Menu

2. Using the **Menu Control**, arrow down to backlight **SYSTEM SETUP** selection, and press the SELECT button to bring up the main menu, then select the ARCHIVE option, followed by the DICOM option.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

SYSTEM SETUP Sub-Menu

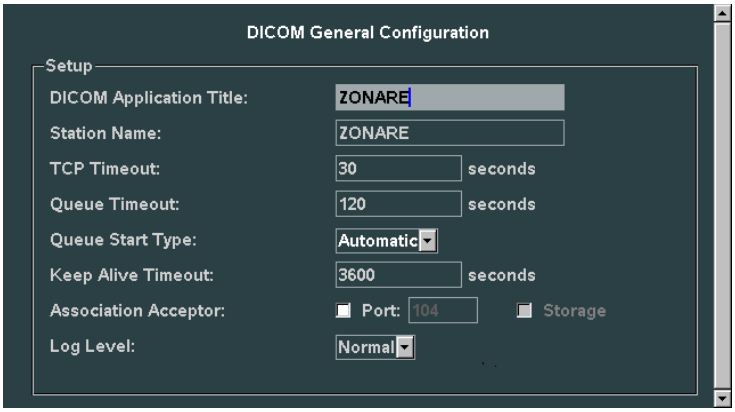


DICOM Sub-Menu

3. Within the **DICOM** selection, use the Menu Control to backlight **GENERAL** selection, and press the SELECT button to bring up this menu.

DICOM Sub-Menu

DICOM GENERAL Sub-Menu



4. Using the alpha-numeric keyboard, enter in the required **DICOM** configuration values/settings in the appropriate fields, as specified in the information previously provided in the "**Pre-Installation Site Survey Form**", by the medical facility's IT System Administrator.

5. To save the new settings, select **APPLY** from the main menu, and press the **SET** key to save new settings.

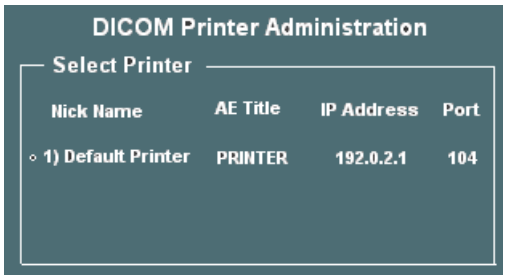
"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

• DICOM "PRINTERS" Configuration

1. Within the **DICOM** selection, use the Menu Control to backlight **PRINTERS** selection, and press the SELECT button to bring up the **DICOM Printer Administration** menu.

DICOM Sub-Menu

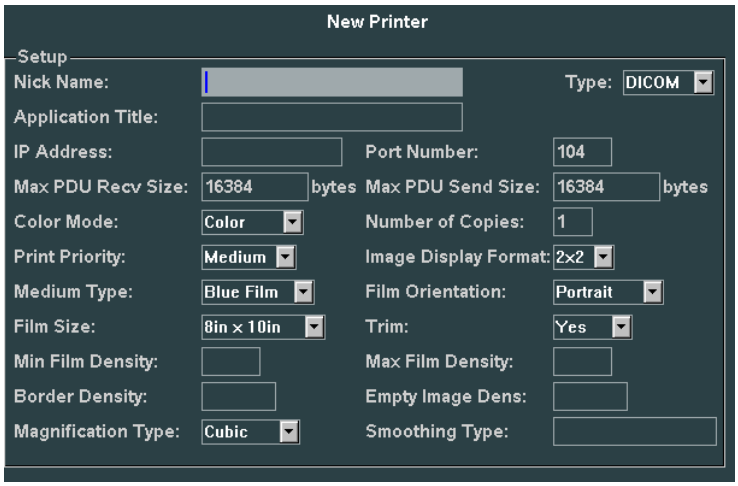
PRINTER Administration Sub-Menu



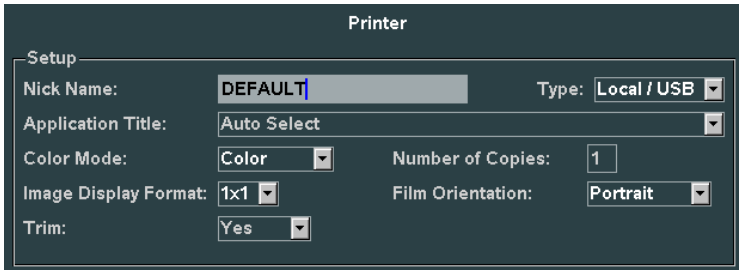
2. To create an entry for a new printer to be added to the DICOM connectivity for the Z.ONE, use the Menu Control to backlight **NEW** from the main menu, and press the SELECT button to bring up the **DICOM Printer Administration** menu.

DICOM Sub-Menu

PRINTER New/Edit Sub-Menu



DICOM Network Printer Setup Page



Local USB Printer Setup Page

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

3. Using the alpha-numeric keyboard, enter in the DICOM configuration values/setting in the appropriate fields, as specified in the information previously provided in the "**Pre-Installation Site Survey Form**", by the medical facility's IT System Administrator.

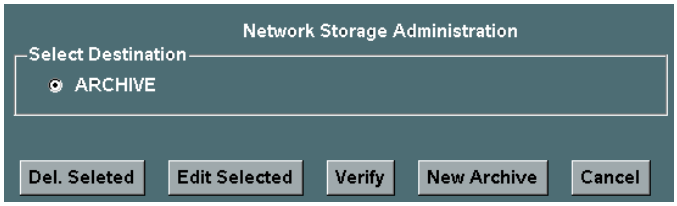
4. To save the new settings, select **APPLY** from the main menu, and press the **SET** key to save new settings.

• DICOM" NETWORK STORE" Configuration

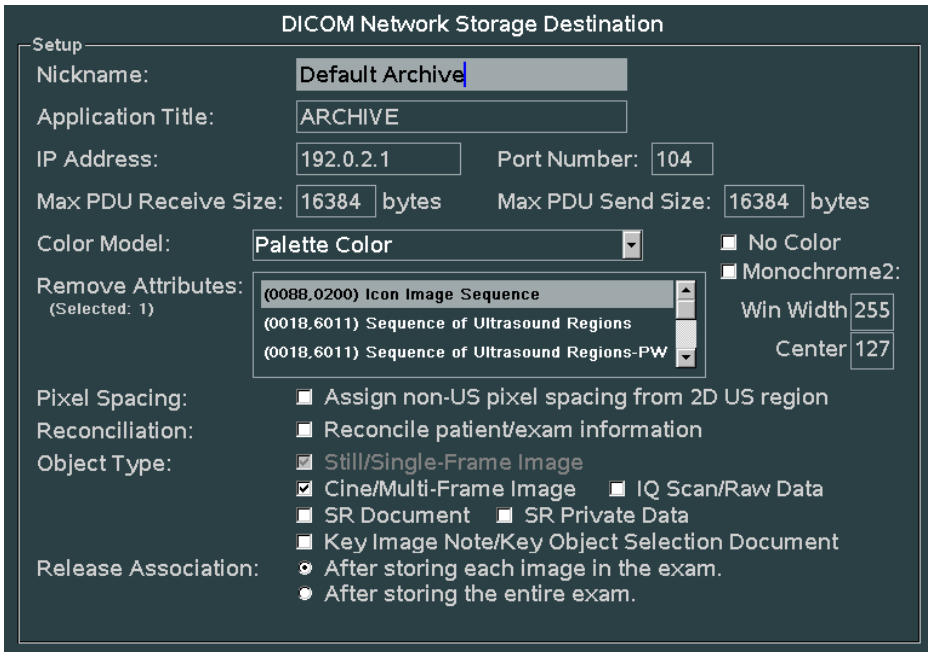
1. Within the **DICOM** selection, use the Menu Control to backlight **Network Store** selection, press Select button to bring up this menu.

DICOM Sub-Menu

DICOM NETWORK STORE Sub-Menu



2. To add a new network store archive, select **NEW** from the main menu, to bring up the following menu.



"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

3. Using the alpha-numeric keyboard, enter in the DICOM configuration values/setting in the appropriate fields, as specified in the information previously provided in the "**Pre-Installation Site Survey Form**", by the medical facility's IT System Administrator.

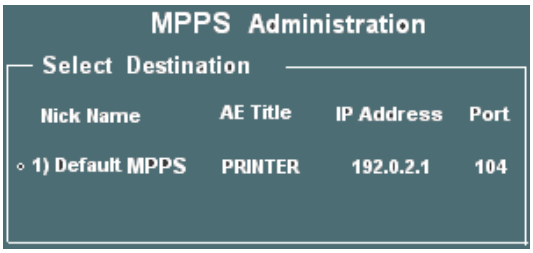
4. To save the new settings, select **APPLY** from the main menu, and press the **SET** key to save new settings.

• DICOM" MPPS" *(Modality Performed Procedure Step)* Configuration

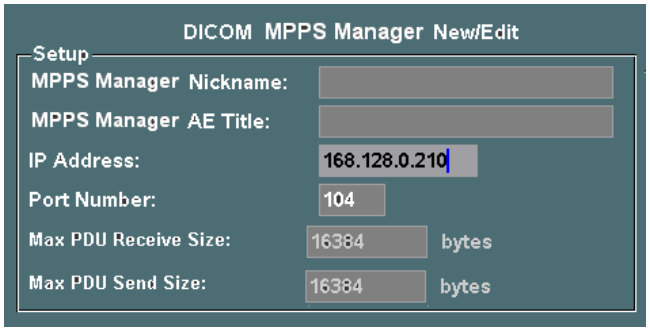
1. Within the **DICOM** selection, use the Menu Control to backlight **MPPS (*Modality Performed Procedure Step*)** selection, press **Select** button to bring up this menu.

DICOM Sub-Menu

DICOM MPPS Sub-Menu



2. To add a new MPPS destination, select the **NEW** from the main menu, to bring up the following sub-menu.



3. Using the alpha-numeric keyboard, enter in the DICOM configuration values/setting in the appropriate fields, as specified in the information previously provided in the "**Pre-Installation Site Survey Form**", by the medical facility's IT System Administrator.

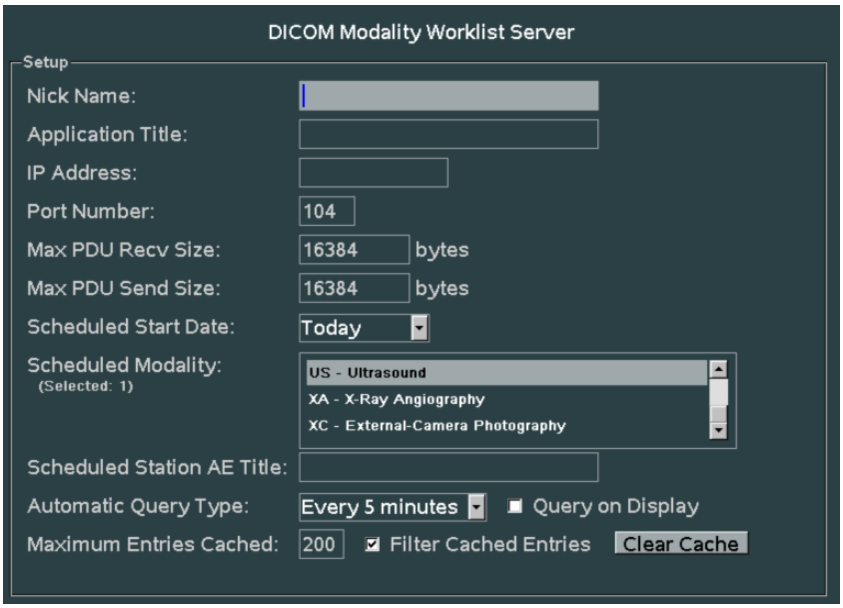
4. To save the new settings, select **APPLY** from the main menu, and press the **SET** key to save new settings.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

• DICOM" WORKLIST" Configuration

1. Within the **DICOM** selection, use the Menu Control to backlight **Worklist** selection, press Select button to bring up this menu.

DICOM Sub-Menu **DICOM WORKLIST CONFIG Sub-Menu**



2. Using the alpha-numeric keyboard, enter in the DICOM worklist values/setting in the appropriate fields, as specified in the information previously provided in the "**Pre-Installation Site Survey Form**", by the medical facility's IT System Administrator.

3. To save the new settings, select **APPLY** from the main menu, and press the **SET** key to save new settings.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

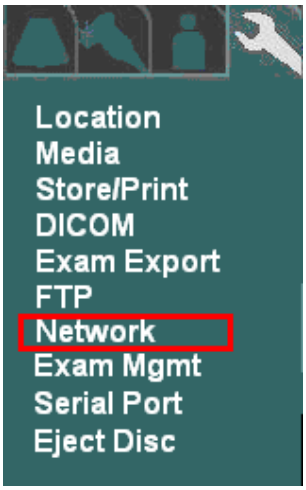
8.5 "Network" Setup

The "NETWORK" configuration menu allows for configuring the TCP/IP networking parameters that will be assigned to define the identity of the Z-ONE on the hospital's network.

1. Using the page TAB button to advance menu screen to select **TOOLS** menu, then select **SYSTEM SETUP**.

SYSTEM SETUP Menu

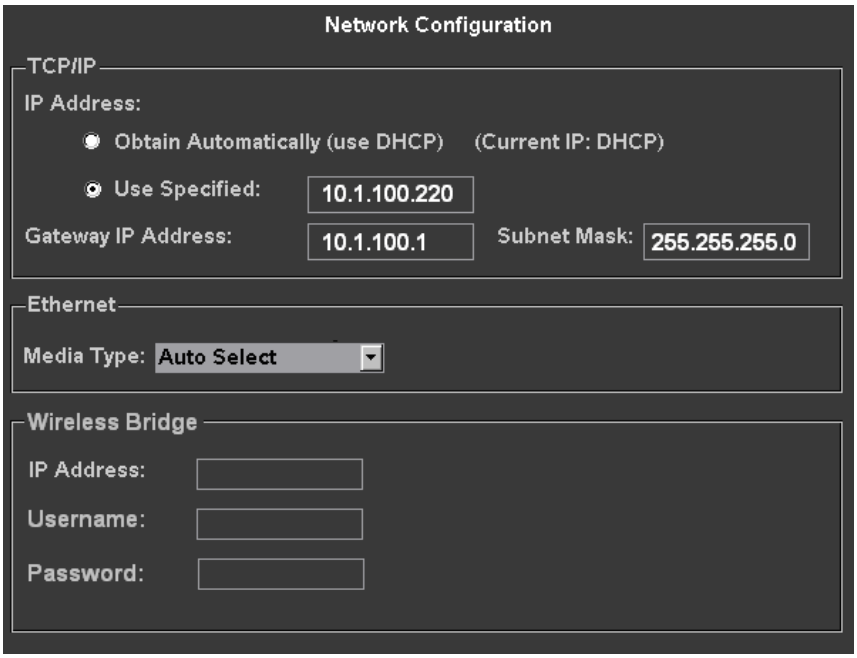
NETWORK Menu



2. Using the **Menu Control**, arrow down to backlight **ARCHIVE** selection, and press the SELECT button to bring up this menu.
3. Using the **Menu Control**, arrow down to backlight **NETWORK** selection, and press the SELECT button to bring up this menu.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

NETWORK Sub-Menu



4. Using the alpha-numeric keyboard, enter in the required TCP/IP network configuration values/settings in the appropriate fields, as specified in the information previously provided in the "**Pre-Installation Site Survey Form**", by the medical facility's IT System Administrator.
5. Using the **Menu Control**, arrow down to backlight **Apply** selection in the main menu, and press the SELECT button to save the serial port configuration setup, and exit.

8.5.1 "Wireless Network" Equipment - Setup

ZONARE supports wireless connectivity using the **Quatech** *(brand)* **AirborneDirect** *(model)* Wireless Ethernet Bridge (supported model is the ABDG-ET-DP501, or currently obsolete model ABDG-ET-DP101). This is a plug-and-play wireless networking solution that is compatible with all ZONARE ultrasound systems that support Ethernet connectivity. A special power cable, however, is required to supply power to the **Quatech AirborneDirect** device from a USB port on the ZONARE system, for portable operations.

The **Quatech AirborneDirect** Wireless Ethernet Bridge works with all ZONARE software release revisions; however the 3.5 and subsequent software releases have specific enhancements to provide user feedback for signal strength and wireless connectivity.

The **Quatech AirborneDirect** Wireless Ethernet Bridge supports WiFi 802.11b/g wireless standards and connects to the ZONARE system through a 10 Base-T network interface. This device supports WEP (64/128 bit) and WPA encryption standards, and LEAP for network authentication (LEAP required the Quatech device to be configured with a static 128 bit key; this is known as "migration mode" and is not recommended for longterm use due to the static WEP key requirement). Before using it with the ZONARE system, the **Quatech AirborneDirect** device must

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

be preconfigured for the user's networking environment – SSID, channel, encryption, and correct addressing scheme (DHCP/static).

Static IP addressing is required in order to be able to display the additional wireless status. When power is applied to a correctly configured **Quatech AirborneDirect** device that is connected to the Ethernet port on the ZONARE system, it will require 30 to 60 seconds to detect and then associate with the user's wireless network. Once a wireless network connection is established, the ZONARE system will reflect the connection state by showing the network ICON on screen, in an uncrossed state.

The configuration of the **Wireless Bridge** is done on the **Network** configuration screen. The source information required for wireless device configuration on the **Z.ONE*Ultra***, is the static **IP Address** assigned (by the IT Administrator at the install site) to the **Quatech AirborneDirect** device and the **Username** and **Password** for the CLI interface (default is **dpac** for both).

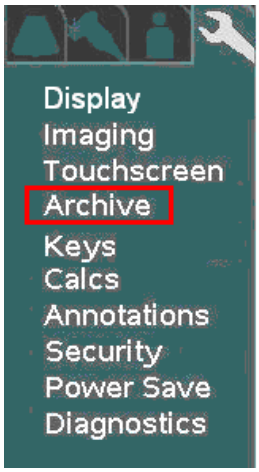
For assistance with the configuration of the local network settings on the **Z.ONE*Ultra***,, to support that aspect of a wireless network installation, contact Zonare Technical Support.

8.6 "FTP" Setup

The "**FTP**" configuration menu allows for configuring the IP address and AE Title settings for direct network attached transfer (**STORE**) operations from the Z.ONE to remote storage on an FTP server, using the FTP protocol..

1. Using the page TAB button to advance menu screen to select **TOOLS** menu, then select **SYSTEM SETUP**.

SYSTEM SETUP Menu



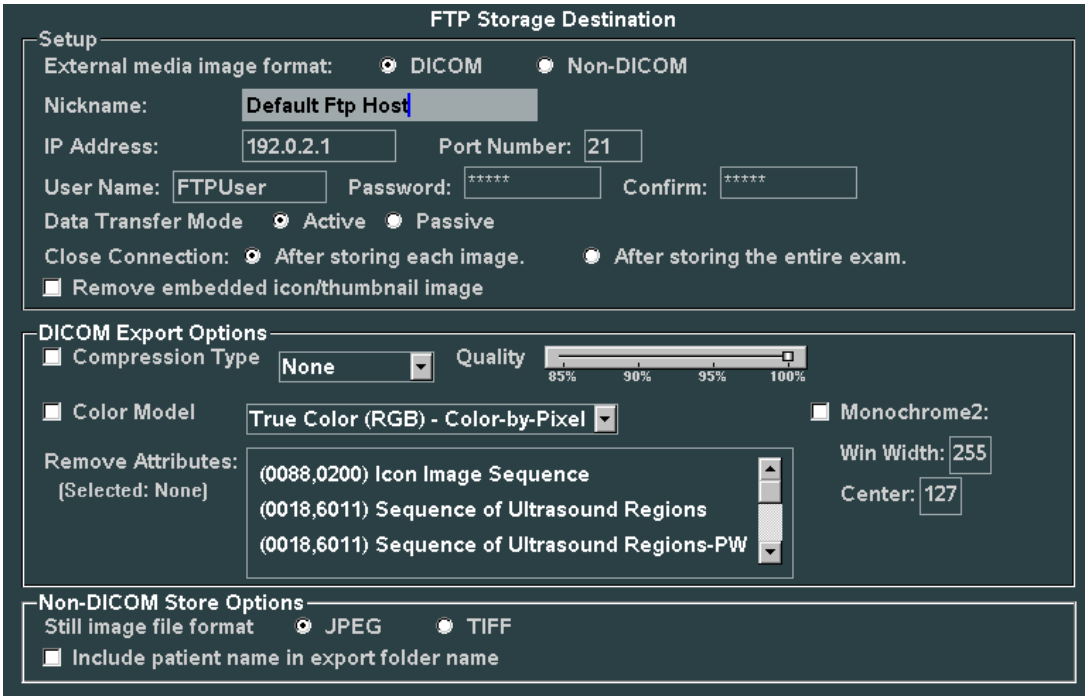
ARCHIVE Menu

2. Using the **Menu Control**, arrow down to backlight **ARCHIVE** selection, and press the SELECT button to bring up this menu.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

3. Using the **Menu Control**, arrow down to backlight **FTP** selection, and press the SELECT button to bring up this menu.
4. Using the Menu Control, arrow down to backlight **FTP Store** selection, and press the SELECT button to bring up this menu **FTP Store** Sub-Menu

5. Using the alpha-numeric keyboard, enter in the required FTP configuration values/settings in the appropriate fields, as specified in the information previously provided in the "**Pre-Installation Site Survey Form**", by the medical facility's IT System Administrator.



6. Using the **Menu Control**, arrow down to backlight **Apply** selection in the main menu, and press the SELECT button to save the serial port configuration setup, and exit.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

9 ADVANCED SYSTEM SETUP CONFIGURATION

9.1 "Security" Setup Menus

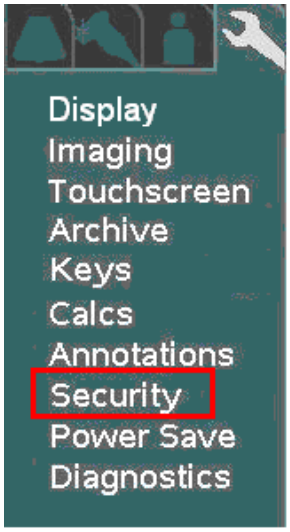
WARNING

*If the security password is lost or forgotten, there is **NO** master password available to recover system access.*

To restore use of the Z.ONE*Ultra it will be necessary to perform a complete re-installation of system software. Refer to the "Advanced" Software Installation Procedure information in this manual.*

1. Using the page TAB button to advance menu screen to select **TOOLS** menu.

TOOLS Menu



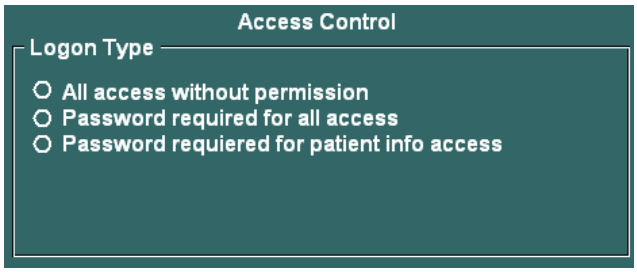
2. Using the **Menu Control**, arrow down to backlight **SECURITY** selection, and press the SELECT button to bring up this menu.

SECURITY Sub-Menu

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

3. Select the desired level of security control, by clicking on the bullet to the left of the desired offering in the menu.

ACCESS CONTROL Sub-Menu



4. Under the Logon Password field, enter in the desired security access password. (NOTE: You will need to enter it in a second time in the "CONFIRM" field, to ensure accuracy).

5. To save the new Security settings, select **Apply** on the main menu, and exit.

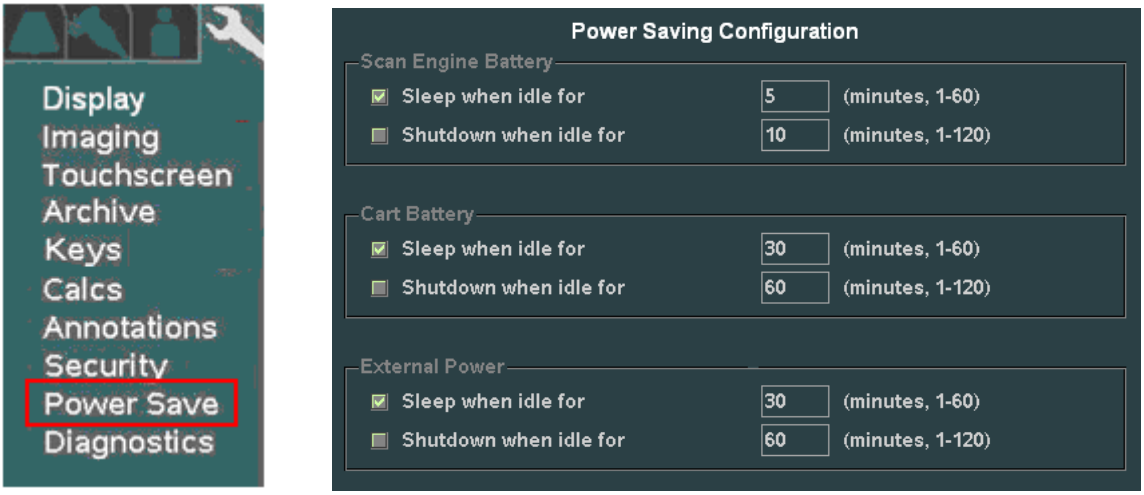
"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

9.2 "Power Save" Setup Menu

- **Configuring "Power Save" Configuration**

1. Within the **System Setup** screen, use the Menu Control to backlight **Power Save** selection, press Select button to bring up this menu.

SYSTEM SETUP Sub-Menu **POWER SAVE Sub-Menu**



The three different categories of power operation mode configurations in this menu are:

Title	Definition
Scan Engine Battery	Configuration of power saving action when the scan engine is being operated "standalone" (undocked) mode, on its internal battery
Cart Battery	Configuration of power saving action when the system is being operated in a docked mode in a SmartCart, without AC power applied. System will be running off the SmartCart's internal Z-PAK battery
External Power	Configuration of power saving action when the system is being operated in a docked mode, running off AC wall power

The two configurable Power Save behaviors offered are:

Title	Function
Sleep when idle	Screen display is "Blanked", after configured time period has elapsed
Shutdown	Scan Engine performs a complete sequenced "Power-Down" operation, after configured time period has elapsed

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

2. For each of the power configurations, select the desired power saving option, and enter the desired time interval, from the menu.

   NOTE*: Unchecking the "Enabled" box, for either option, disables that time-out function*

3. Place the arrow cursor over the **APPLY** soft-button displayed in this menu, and press the **SET** key to save new settings.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

10.1 Installing USB Memory Stick, into the Scan Engine/Scan Module

STEPS:

1. Open the access cover door, at the rear (if unit is a Scan Engine)
2. Hold the USB Memory stick properly aligned with the USB port connector. Push the USB Memory Stick gently all the way into the connector.

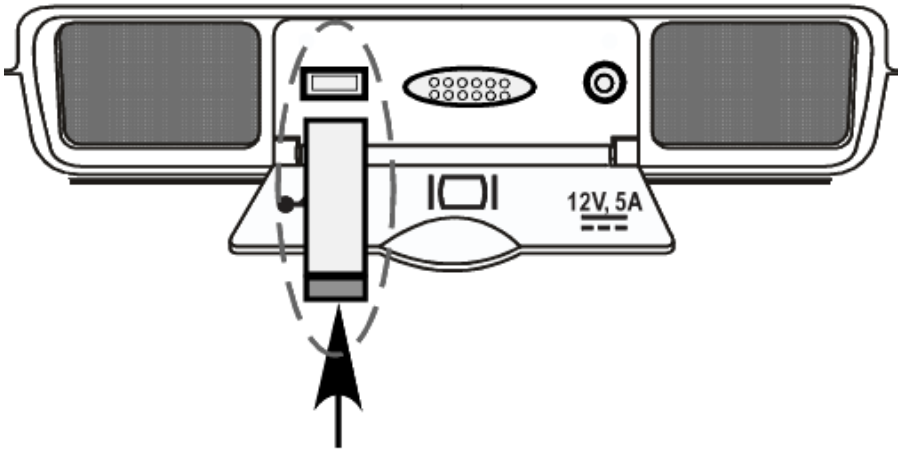


Figure 41: Installing USB Memory Stick

3. For image Importing or Exporting from/to the USB Memory Stick:
   - On the SmartCart: Press the *Archive* key
   - On the Scan Engine: using the TOOLS tab, select *View Archive*

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

11 FUNCTIONAL DESCRIPTIONS

11.1 Overall System

11.1.1 Features Overview

SYSTEM OVERALL:

- 64-hardware - 128/192-synthetic channel system
- Supports B-Mode, M-Mode, Color, Power Doppler, PW, CW modes (w/Cardiac Option)

SMARTCART:

- 19” full-screen, 1280 x 1024 resolution, Display
- Full-sized alpha-numeric user keyboard
- Discrete function user controls
- Software mode assignable user controls
- Four user configurable function (F1-F4) keys
- 8-Pot DGC slider controls
- Trackball
- Integrated stereo speakers (located in display)
- External I/O device connectivity (through SmartCart dock interface)
  - DVI digital video out (using HDMI connector)
  - Ethernet 10/100Base-T
  - USB 2.0 Full-speed ports (4)
- Internal hard disk drive (Additional image archive)
- Internal CD/DVD Multi-Recorder
- On-board Z-Pack Battery Module (Option)
- Multi-Transducer Port (MTP) – 3 connectors (Option)
- CW Only Transducer Port – 1 connector (Cardiac Option)
- ECG Module – 1 port (Cardiac Option)

SCAN ENGINE:

- 5.8” diagonal, 800 x 480 resolution, LCD Display
- Touchscreen
- Internal CompactFlash Storage (Primary image archive)
- Discrete function user controls
- Two user configurable function (F1-F2) keys
- Trackball
- Integrated microphone
- Integrated stereo speakers
- Battery status indicator LEDs
- USB 2.0 Full-speed port
- +12V/6A DC power input port

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- DVI (HDMI connector) digital video output port

SCAN MODULE:

- Internal CompactFlash Storage (Primary image archive)
- USB 2.0 Full-speed port
- +12V/6A DC power input port
- DVI (HDMI connector) digital video output port

11.1.2 Electronics Overview (Scan Engine)

- Digitally programmable transmit control
- Pulser - Transmitter
- Analog front end
- Data converter / filters
- Pre-processing digital logic
- Microprocessor-based system control
- DSP pre/post processing
- FPGA connectivity control logic
- Power
  - Lithium-Ion battery pack
  - Smart Battery charger with I^2C interface
  - Lithium coin-cell battery backup for RTC (Real Time Controller)
  - Pushbutton induced power-on, with software controlled shutdown
  - Power supply supervision of all supplies
  - Controlled power supply up/down sequencing

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

11.2 SmartCart

11.2.1 FRU Descriptions

1. SmartCart Main Board Assy.....Zonare P/N: 85080-00

System Functions:

- FPGA Logic for Main Cart control
- USB 2.0 Device Interface
- ATA - DVD/Hard Drive Interface
- Audio/Video Driver & Video Memory
- HSSL Serial Port Interface to/from Scan Engine (Cart Image Data for Display)
- USB Port Interface to/from Scan Engine (Cart U/I Operation)
- Ethernet Controller (networking)

2. SmartCart Power Module Assy .....Zonare P/N: 85025-00

System Functions:

- VScanner Power Supply - +12V (8A)
- VMain Power Supply - +12V (12A)
- VAux Power Supply - +5 to +24V adjustable
- SmartCart Z-PAK battery charging circuitry
- SmartCart Z-PAK battery fuel gauge
- PIC Power Supply Controller logic
- External system status LEDs (5)

3. Scanner Deck (Pallet) Assy (w/o MTP) .....Zonare P/N: 85076-00
Scanner Deck (Pallet) Assy (w/MTP) .....Zonare P/N: 85118-00

System Functions:

- Mechanical docking and locking mechanisms
- Optical sensors for scan engine docking detection
  - HSSL serial data connection
  - Scan Engine USB connection
  - +12V VScanner connection
- (3) Multi-Transducer Port (MTP) connections (85118 only)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4. SmartCart User Interface Assy.....Zonare P/N: 85089-00 or 85808-00

System Functions:

- QWERTY keyboard
- OLED soft-function displays
- Trackball assembly
- DGC controls
- Discrete functional controls

5. OLED Display Board ..... Zonare P/N: 85095-00 (old-style) / 86901-00 (new-style)

System Functions:

- OLED soft-function displays

6. ECG Module – Service FRU.....Zonare P/N: 86122-00

System Functions:

- ECG Patient Lead Interface

7. MTP Bolster Plate (w/o CW) – Service FRU .....Zonare P/N: 85123-00

System Functions:

- Multi Transducer Port switching relays

8. MTP Bolster Plate w/CW Module – Service FRU .....Zonare P/N: 86123-00

System Functions:

- Multi Transducer Port switching relays
- CW mode transmitter/receiver module

11.2.2 Electro and Mechanical Assemblies

1. Brake Mechanism - Wheel

Description:

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

The SmartCart has 3 different swivel/lock positions of the foot pedal on the front wheels. Using the bottom of your shoe to push down, or the top of your shoe under the lever to pull-up, position the foot pedal in the desired position, as listed below:

- In the upper-most position (directional swivel-lock position) of the foot pedal allows the front wheels to lock in a straight inline position and the back wheels to full swivel. This provides a good combination of stability and maneuverability when pushing the system down long corridors.
- The middle position of the foot pedal allows full-swivel of the front wheels, which in creating full four wheel swivel, allows for easy micro-positioning of the system in tight spaces.
- In the fully down position of the foot pedal the brake mechanism will lock the front wheels from rotation. This prevents undesired movement of the SmartCart during system operation.

In addition to locking the brake, the front wheels may be rotated to a 90-degree angle, prior to locking foot pedal down, to provide additional system stability during shipping.

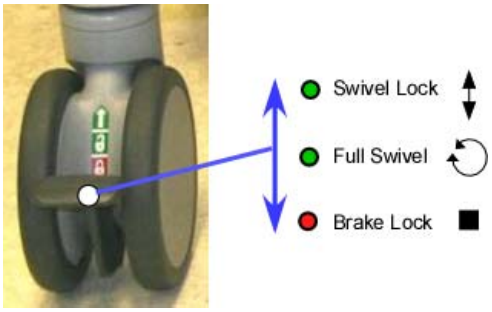


Figure 42: SmartCart: Brake Mechanism

2. Height Adjustment Mechanism

Description:

The SmartCart utilizes a gas spring mechanism that enables the user to optimize the vertical position (height) of the user interface panel and LCD Display for optimum comfort and viewing during operation.

To raise or lower the unit, pull inward on the release lever, located on the inside of the right-front handle assembly on the SmartCart. This will allow the height of the SmartCart to be adjusted. Releasing the spring-loaded release lever locks the assembly into the current vertical position.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Figure 43: SmartCart: Height Adjustment Mechanism

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

12 POWER & SIGNAL DISTRIBUTION DIAGRAMS

BEGINS ON NEXT PAGE

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

12.1 SmartCart Power Module Block Diagram (Basic)

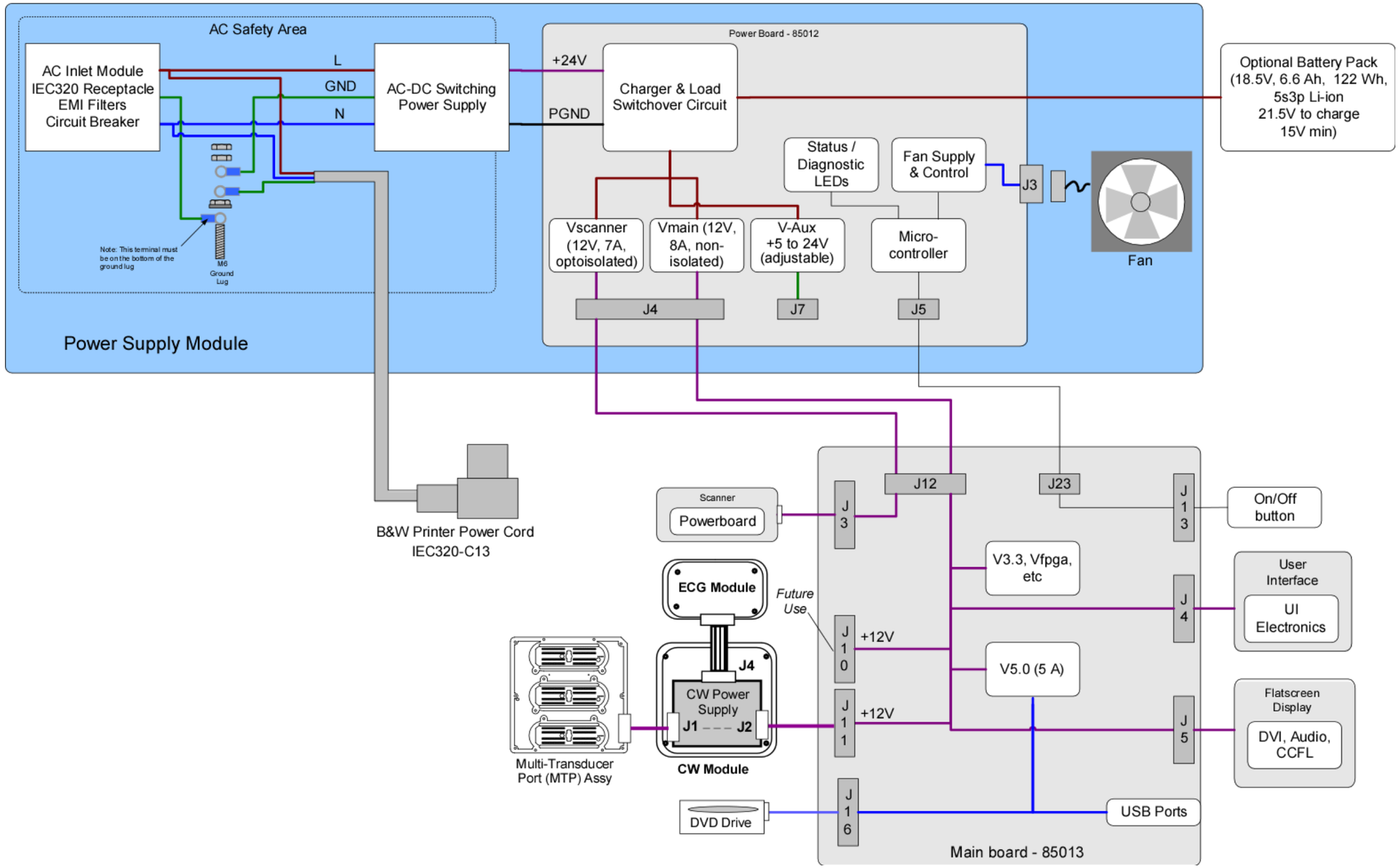


Figure 44: SmartCart: Power Module Block Diagram (Basic)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

12.2 SmartCart Power Module Block Diagram (Detailed)

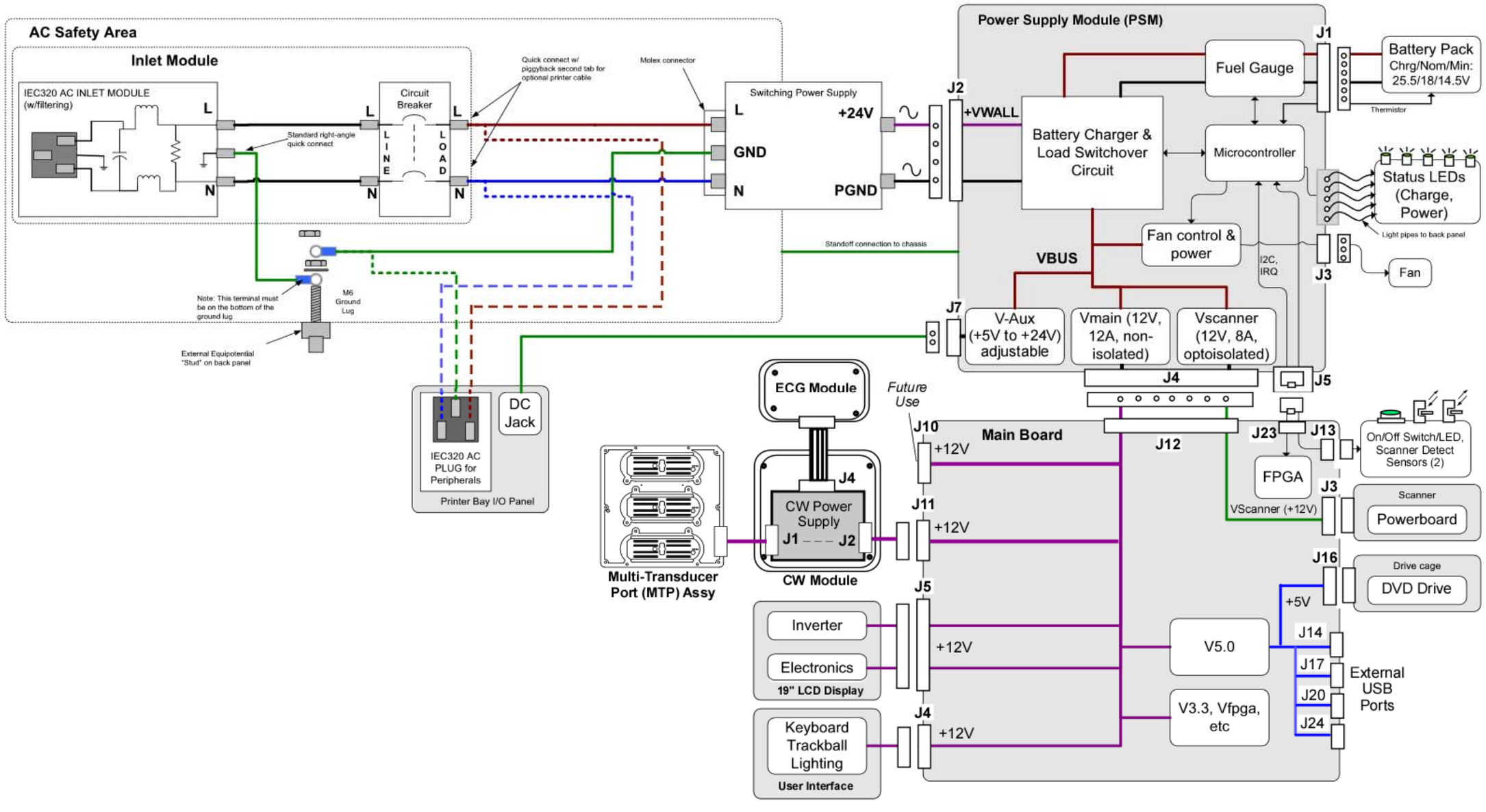
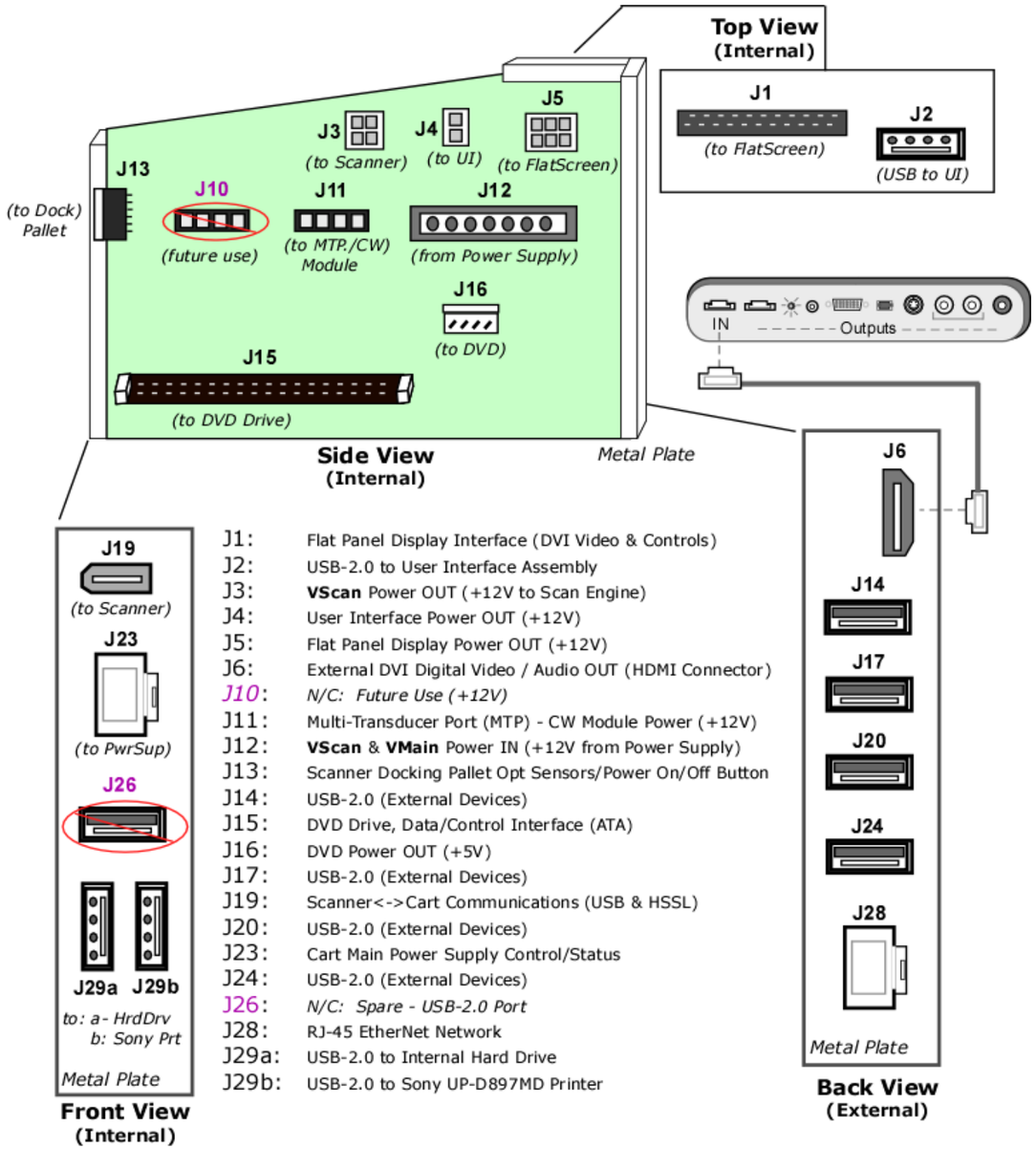


Figure 45: SmartCart: Power Module Block Diagram (Detailed)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

12.3 SmartCart Main Board Cable Connect Diagram (Original DVD Config)



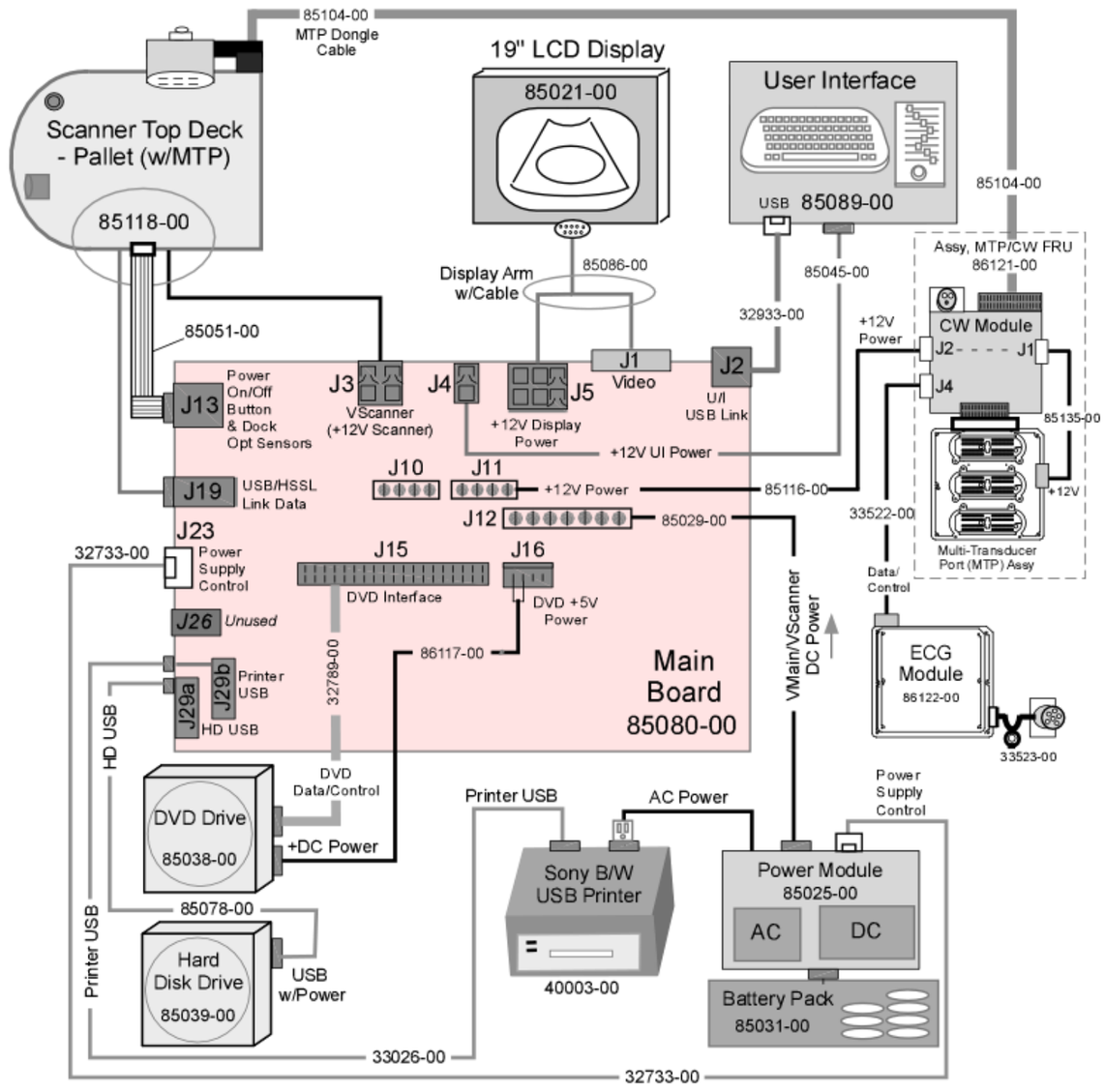


Figure 46: SmartCart: Main Board Cable Connection Diagrams (Original DVD)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

12.4 SmartCart Main Board Cable Connect Diagram (IDE/SATA Adapter DVD Config)

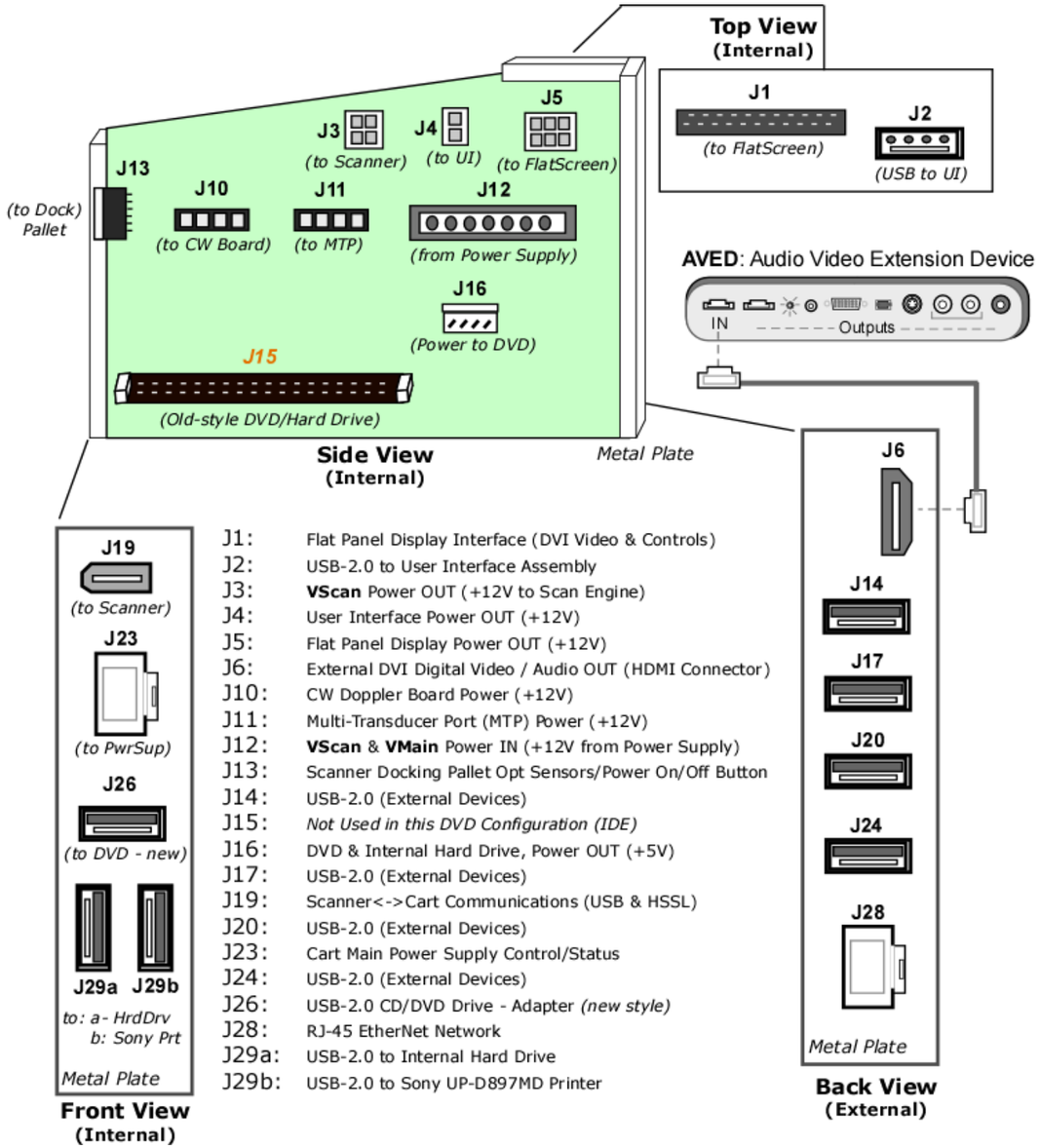
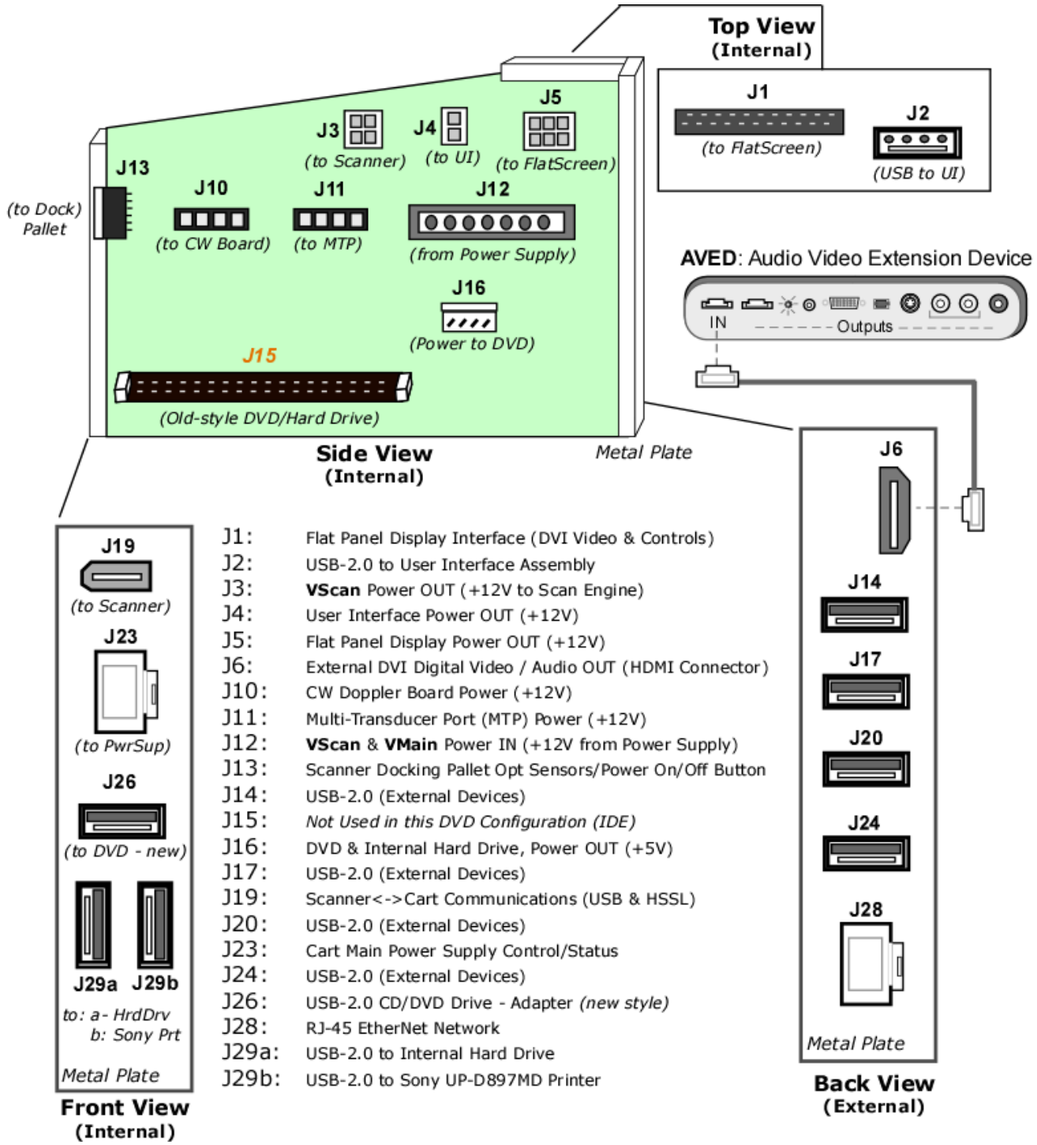


Figure 47: SmartCart: Main Board Cable Connect Diagrams (IDE/USB Adapter Style DVD)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

12.5 SmartCart Main Board Cable Connection Diagram (USB Style DVD Configuration)



J1: Flat Panel Display Interface (DVI Video & Controls)
J2: USB-2.0 to User Interface Assembly
J3: **VScan** Power OUT (+12V to Scan Engine)
J4: User Interface Power OUT (+12V)
J5: Flat Panel Display Power OUT (+12V)
J6: External DVI Digital Video / Audio OUT (HDMI Connector)
J10: CW Doppler Board Power (+12V)
J11: Multi-Transducer Port (MTP) Power (+12V)
J12: **VScan** & **VMain** Power IN (+12V from Power Supply)
J13: Scanner Docking Pallet Opt Sensors/Power On/Off Button
J14: USB-2.0 (External Devices)
J15: *Not Used in this DVD Configuration (IDE)*
J16: DVD & Internal Hard Drive, Power OUT (+5V)
J17: USB-2.0 (External Devices)
J19: Scanner<->Cart Communications (USB & HSSL)
J20: USB-2.0 (External Devices)
J23: Cart Main Power Supply Control/Status
J24: USB-2.0 (External Devices)
J26: USB-2.0 CD/DVD Drive - Adapter *(new style)*
J28: RJ-45 EtherNet Network
J29a: USB-2.0 to Internal Hard Drive
J29b: USB-2.0 to Sony UP-D897MD Printer

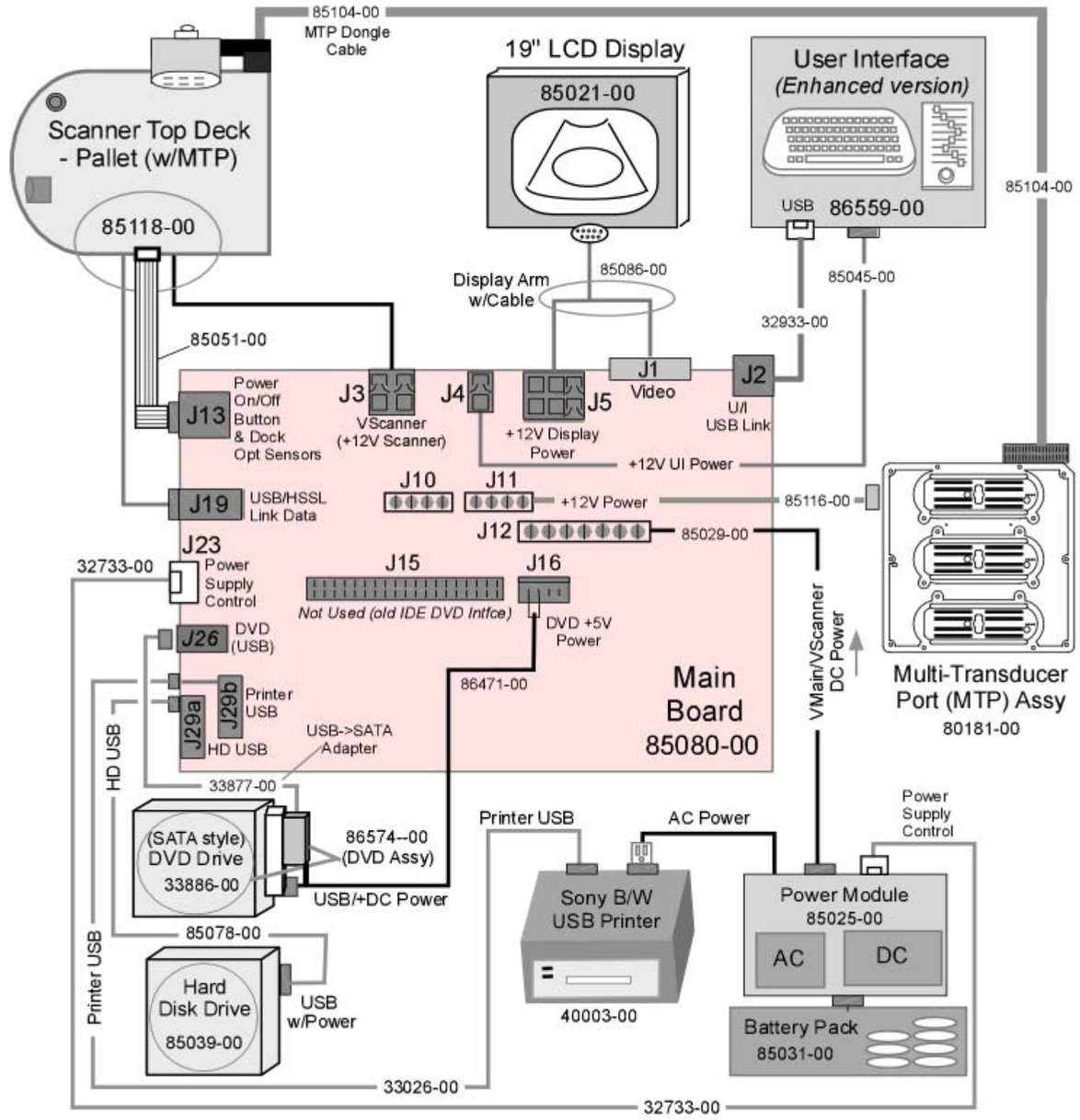


Figure 48: SmartCart: Main Board Cable Connect Diagrams (USB Style DVD Drive)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

12.6 *mini*Cart AC/DC Power Distribution Diagram

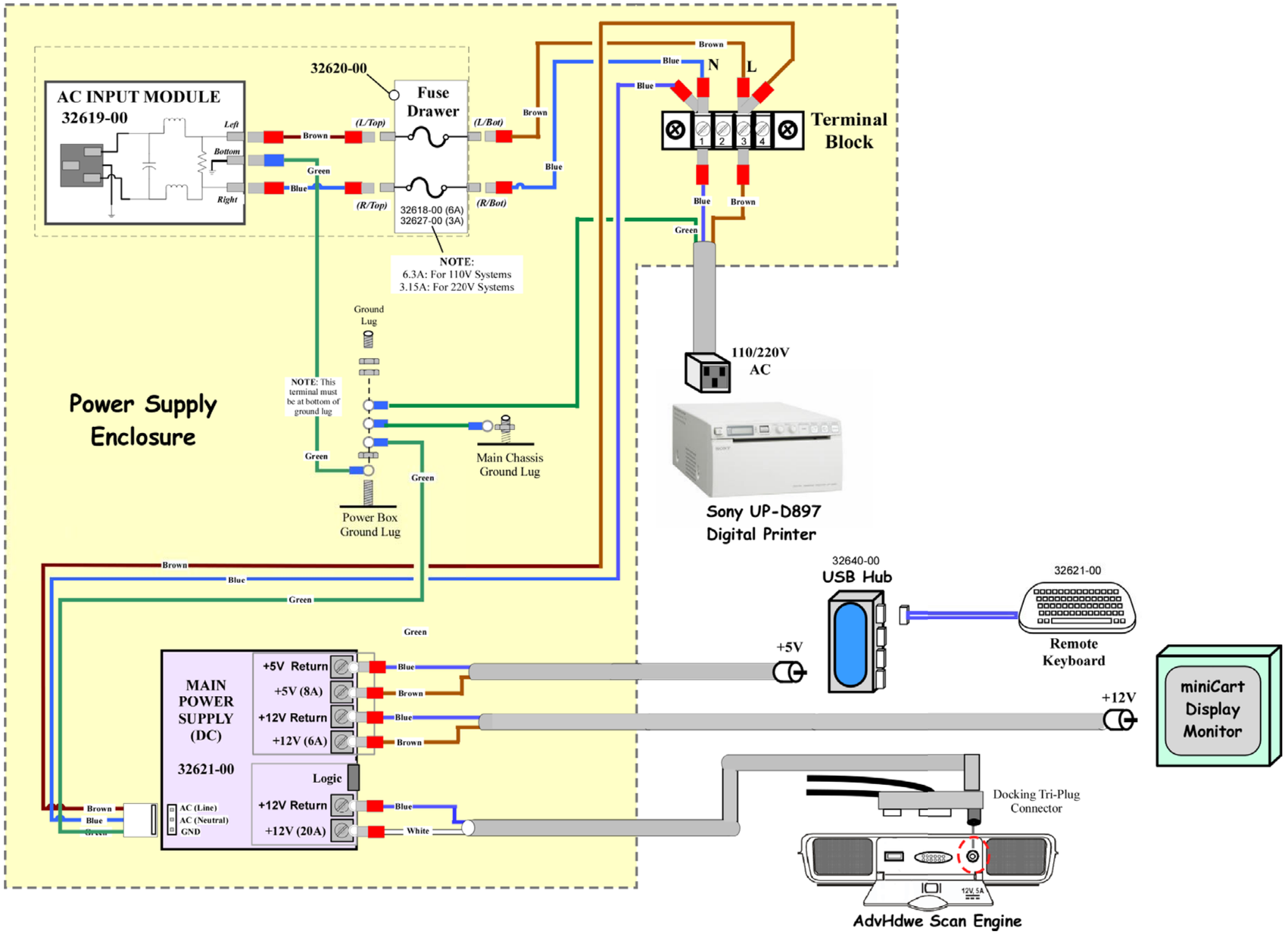


Figure 49: *mini*Cart: AC/DC Power Distribution Diagram

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

BEGINS ON NEXT PAGE

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

13.1 Z.ONE*Ultra* Overall System Block Diagram (SmartCart w/Cardiac-Option Configuration)

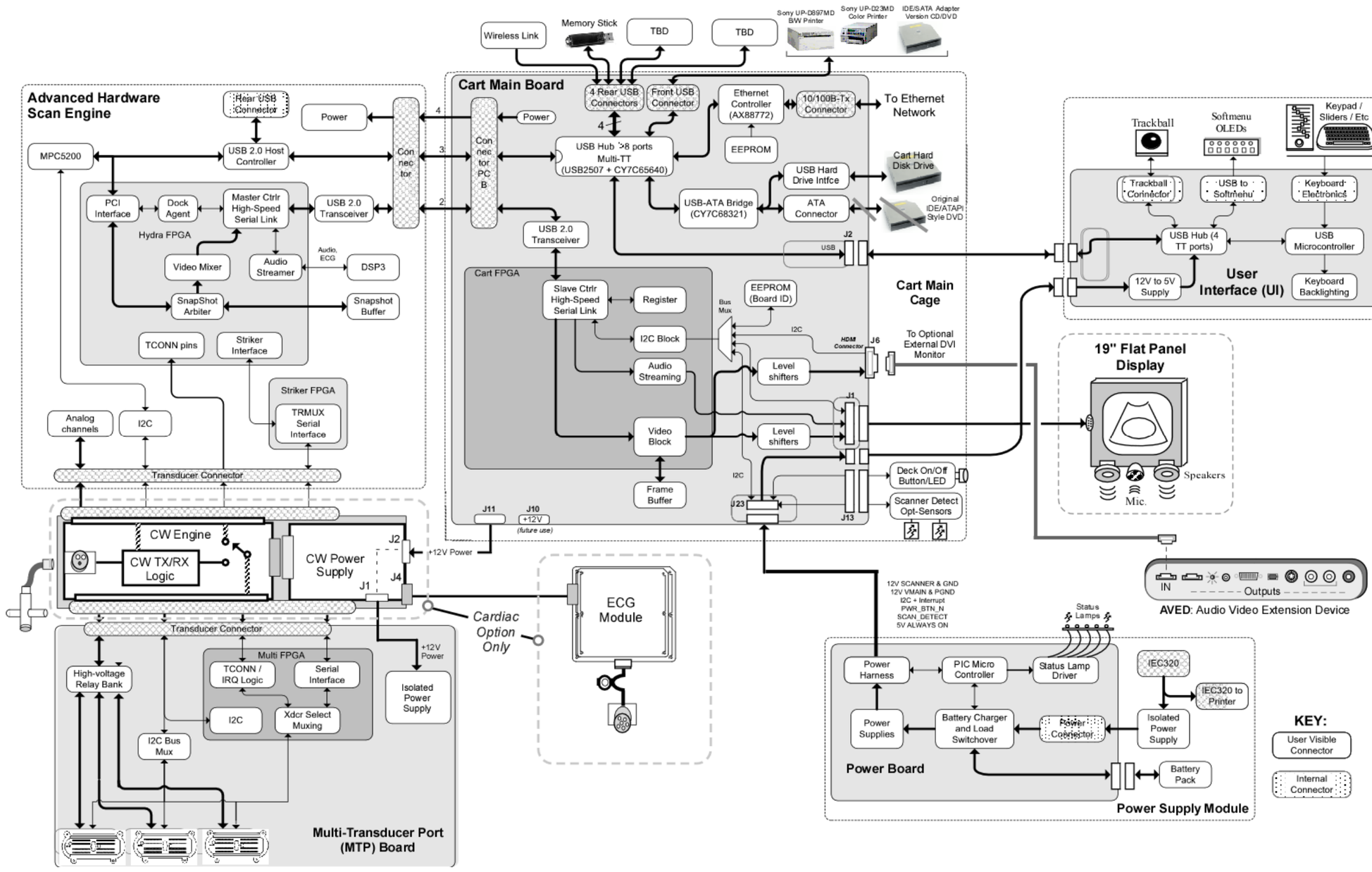


Figure 50: Overall System Block Diagram (AdvHdwe Scan Engine & SmartCart w/Cardiac Option)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

13.2 miniCart Configuration: Overall System Block Diagram

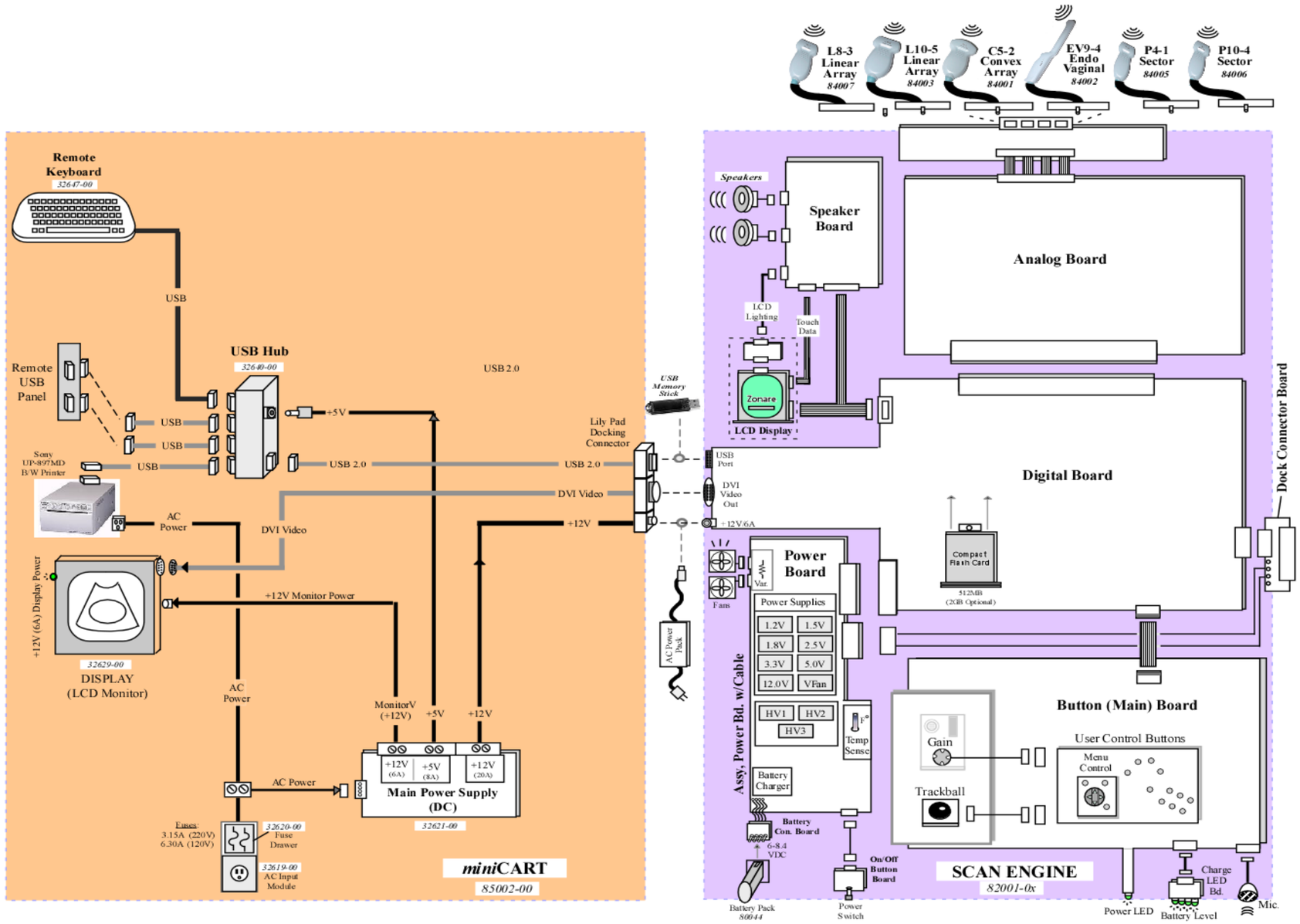


Figure 51: Overall System Block Diagram (AdvHdwe Scan Engine & *mini*Cart)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

13.3 Z.ONE*Ultra* SmartCart - *Cardiac Module (CW/ECG) Option - Block* Diagram

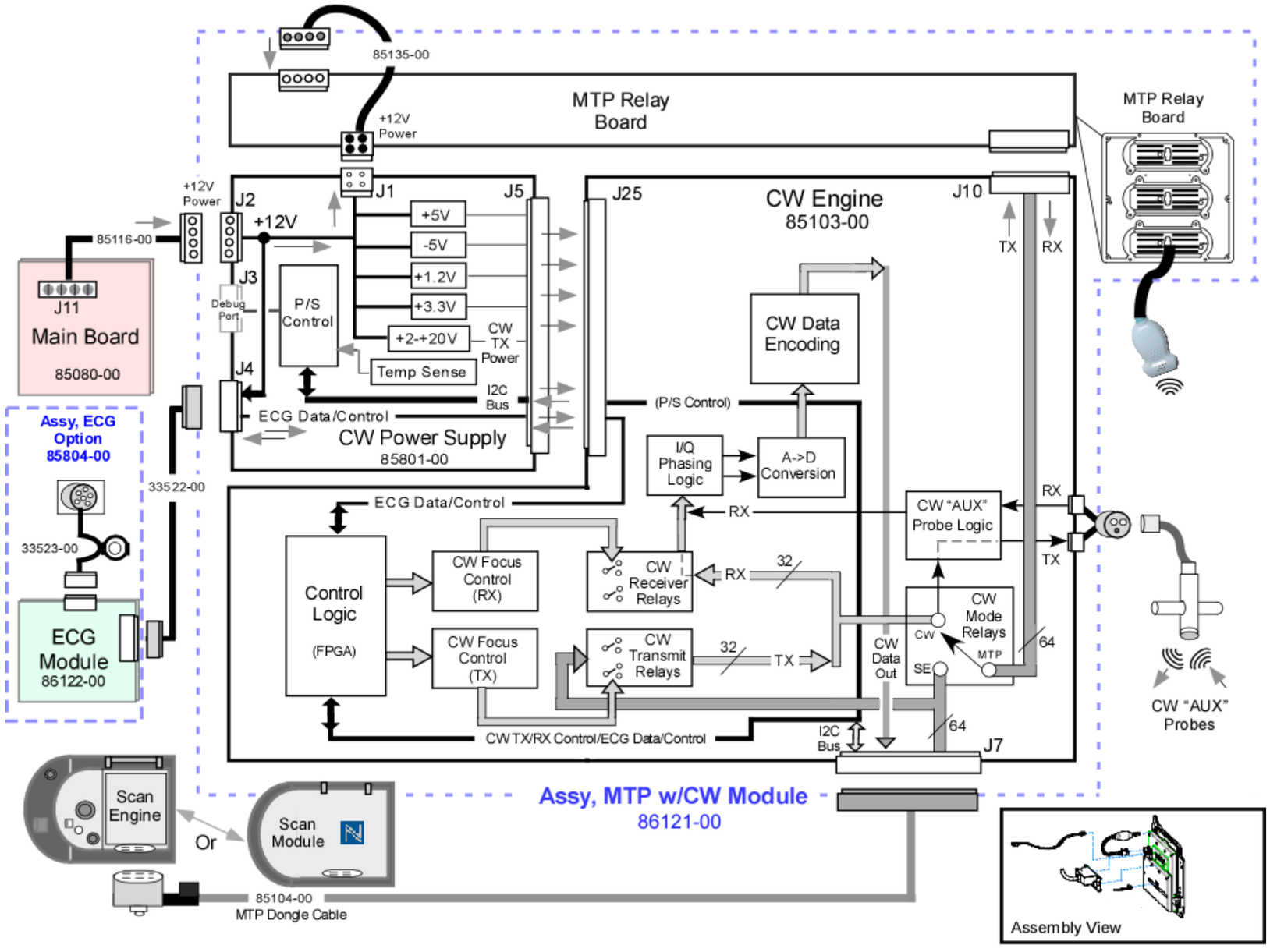


Figure 52: SmartCart: Cardiac Option (CW/ECG) Module Block Diagram

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

14 ASSEMBLY DIAGRAMS

14.1 SmartCart: Power Module Functional Identification

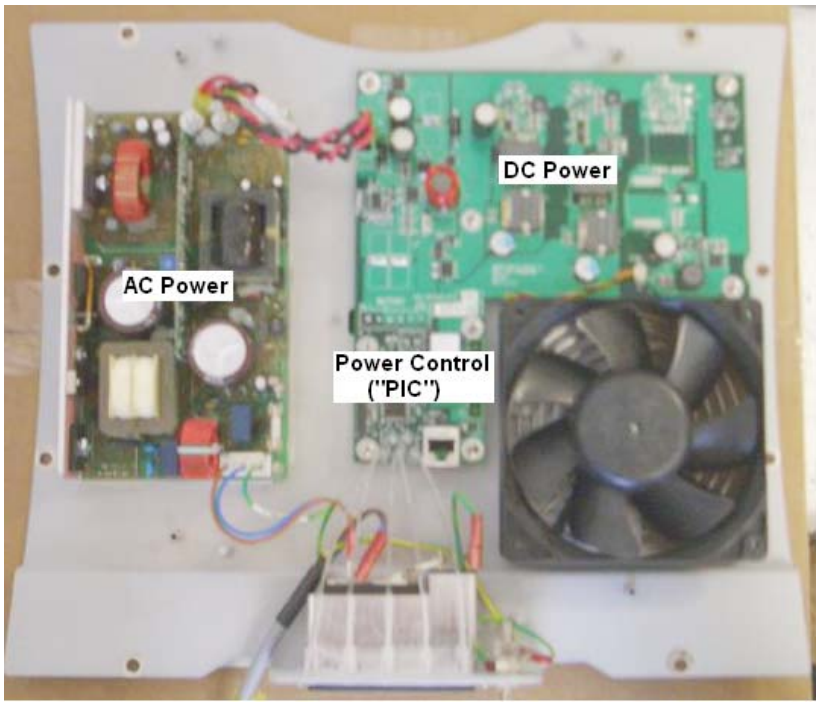


Figure 53: SmartCart: Power Module Functions Diagram

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

15 PERIPHERALS & ACCESSORIES

15.1 DVD/CD Burner - *(Internal)*"

15.1.1 General Info:

The Z.ONEUltra (SmartCart) includes an internal **DVD/CD** burner that is used for exporting of ultrasound images. The port for accessing the DVD/CD drive for insertion/removal of media, is located at the front of the SmartCart, just below the scan engine docking area.

15.1.2 Media Types:

The **DVD/CD** drive in the Z.ONEUltra supports only the following media types. Any other media type inserted into the drive ***will not be recognized*** by the Z.ONEUltra.

IMPORTANT

For use of DVD media type for Exports, only one brand of DVD media has been tested and approved to be compatible for use in the Zonare system. The approved DVD media type is as listed below:

- **Taiyo Yuden** brand DVD media ONLY!

Compatible Media Types:

- **CD**s: ..... **CD-R** (**MINUS** ONLY!)
- **DVD**s: ..... **DVD+R** or **DVD+RW** or **DVD+RDL** (**PLUS** ONLY!)
  - *DVD-R & DVD-RW (**MINUS**) **not** supported*
  - **Taiyo Yuden** *brand DVD media are only type fully qualified by Zonare, and hence recommended*

SPECIAL NOTE

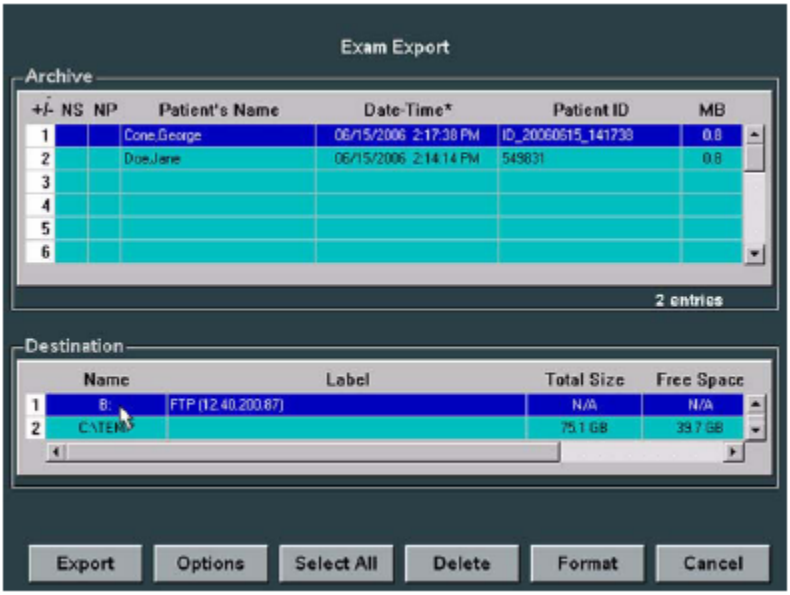
If an incompatible type of DVD/CD media is accidentally inserted into the DVD/CD burner on the Z.ONE*Ultra, it will not be recognized by the system, and hence the "EJECT" function in the ARCHIVE menu will not be active (it will be "grayed-out").*

*In order to eject this type of incompatible media, it will be necessary to perform a manual override "EJECT". This is accomplished by holding down the "**RECORD**" button on the user interface panel of the SmartCart, until the DVD/CD is ejected.*

15.1.3 Operation:

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

The exporting/importing of exam data (images) to/from the **DVD/CD** burner on the Z.ONEUltra is performed in the **ARCHIVE** review menu (pressing the **ARCHIVE** key). The **DVD/CD** burner is then selected as the target device; the desired exam(s) is highlighted in the Archive menu, and the "**EXPORT**" or "**IMPORT**" softkey function selected to copy the images.



15.2 AVED – Audio Video Extension Device Box - *(Option)*"

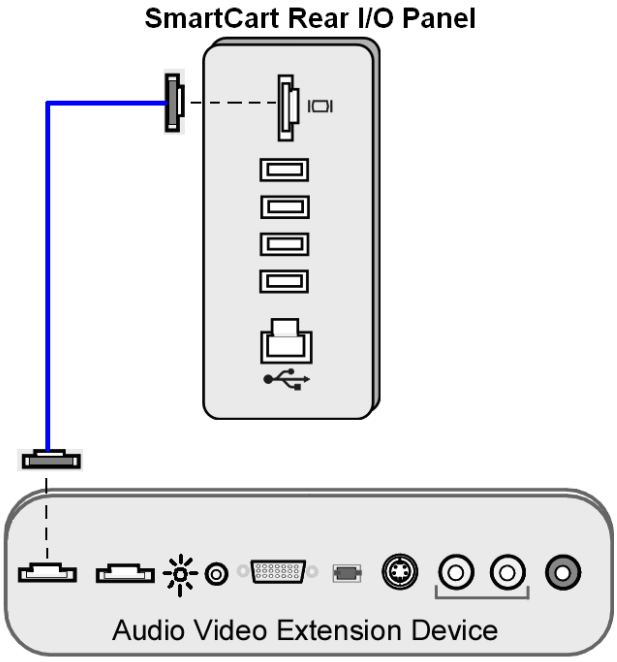
15.2.1 General Info:

Zonare offers an optional AVED (Audio Video Extension Device) box that can be connected remotely to the rear panel of a SmartCart. This device enables the Z.ONEUltra to produce an extended range of video and audio output formats (primarily analog) to support connection to additional peripheral devices.

The connection of the AVED box and the Zonare Z.ONEUltra is made through a single HDMI->HDMI cable. The AVED box receives its operating power (+5V), controls, and digital video and audio information via this single cable that attaches directly between the external HDMI port on the rear of the SmartCart, and the HDMI Input port on the AVED box (as shown below).

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

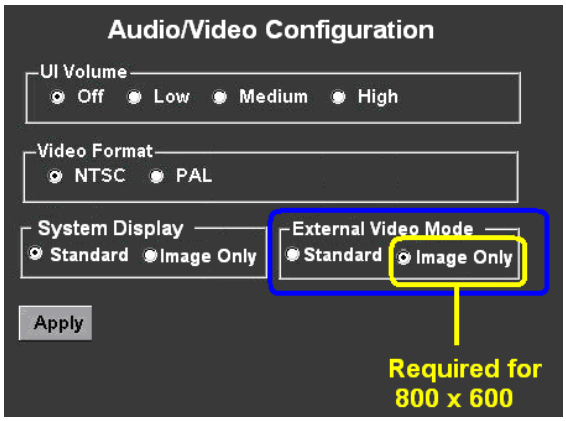
Only the HDMI->HDMI cable provided by Zonare should be used, as cables of additional length may result in loss of operation of the AVED; due to voltage drop induced by the added impedance.



SPECIAL NOTE

*The **S-Video** and **Composite** video outputs (output #6 and #9 in the I/O Panel Diagram on the following page) on the AVED box only support video formats of a maximum resolution of 800 x 600.*

As a result, video is ONLY present on these two outputs of the AVED box when the "External Video Mode" option, on the Audio/Video Configuration page on the Z.ONE*Ultra, is set for "**Image Only**" mode.*



*In addition it should be noted that if the User is reviewing Archived images in the full **3x3** format, the system automatically(temporarily) switches out of the "Image Only" (800x600) video resolution, to the higher resolution format. As a result, the video output on these same two ports on the AVED box will not be active at those times.*

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

The AVED box converts the digital video and audio information from the SmartCart into a variety of analog video formats, and analog and digital audio outputs. The I/O ports, and their functions on the AVED, are listed below.

The VCR CTL remote trigger output is generated by pressing of the "**RECORD**" key on the User Interface of the SmartCart.

Additionally one of the FUNCTION (F1-F4) keys on the User Interface of the SmartCart can be assigned to the "**EXT SYNC**" function, which will also cause a trigger on this VCR CTL output of the AVED box.

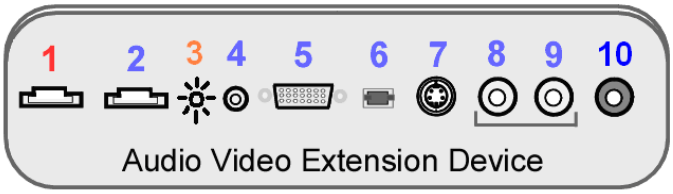
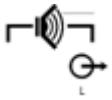


Figure 54: AVED: Audio Video Extension Device I/O Panel Diagram

15.2.2 I/O Connector Functions:

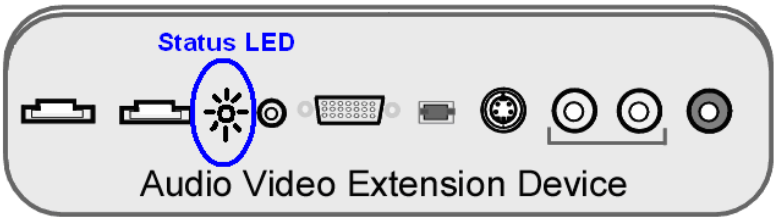
#	Function	Direction
1	DVI Digital Video/Audio (Using HDMI connector)	Input
2	STATUS (LED) – *See status code info below*	Status
3	DVI Digital Video (Using HDMI Connector)	Output
4	VCR/Print Triggers – 2 signals (3.5mm) – "RECORD" key	Output
5	SVGA Video (Analog)	Output
6	TOS LINK Audio (Digital)	Output
7	S-Video (Analog) - *(800x600 mode only!)*	Output
8	Audio Out – Right (Analog)	Output

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

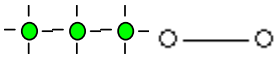
9		Audio Out – Left (Analog)	Output
10		Composite Video (Analog) - *(800x600 mode only!)*	Output

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

15.2.3 AVED Activity/Status LED – Codes:



There is a single LED on the AVED box that is used to display the current operating status of the I/O activities. The status is indicated via a series of codes of flashing sequences. Below is a listing of the activity code states:



3 short "On" – 1 long "Off":... HDMI attached (power) but box "Idle" (no out)

1 long "On" – 1 long "Off":.... AVED initialized – video active, but audio **not**

Constant "On":..... Coded audio detected, video **and** audio active

15.2.4 Microphone Recording: *(SmartCart only)*

The Z.ONE*Ultra* system includes an on-board **microphone** that is located in the front/center of the 19" display monitor on the SmartCart. Voice audio can be captured from the microphone and sent out over the audio channels of the AVED (Audio Video Extension Device) box. This can be used for recording voice audio to an analog VCR device that is connected to the AVED.

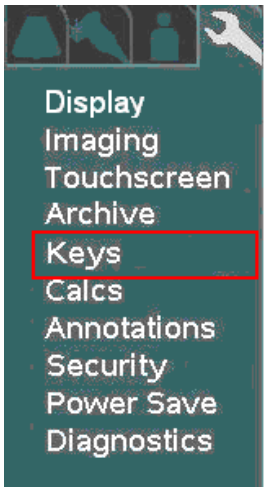
The activating of the **microphone** is a toggle "On"/"Off" function, using one of the **FUNCTION** (**F1-F4**) keys on the User Interface panel of the SmartCart. The desired **FUNCTION** key must be pre-assigned to the "***Microphone***" option, on the Function Key configuration page.

Enabling the "MICROPHONE" function:

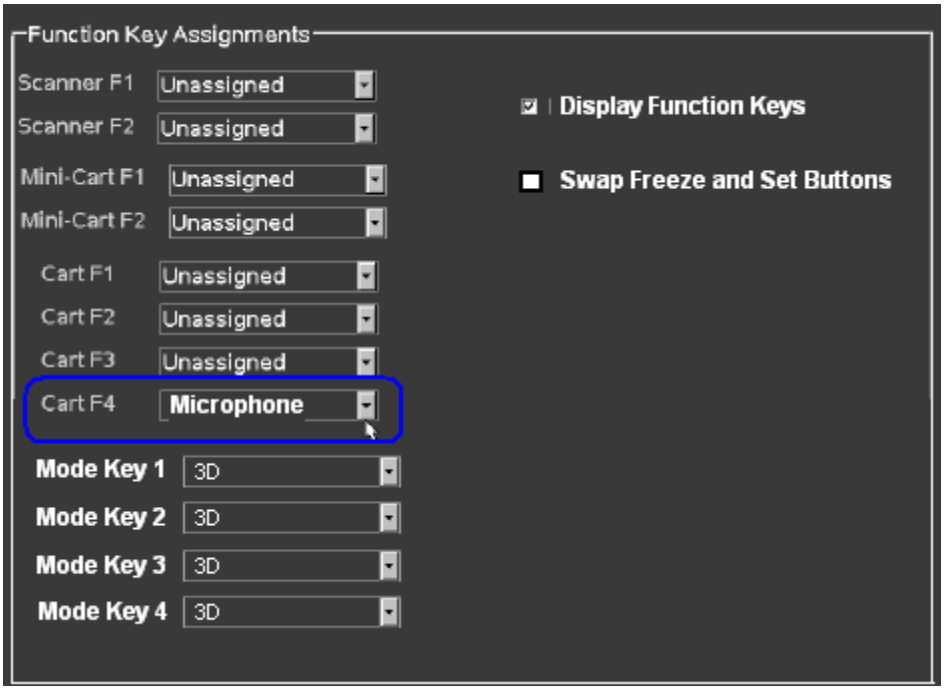
"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

1. Using the TAB button advance the menu screen to select **TOOLS**
2. Using the **Menu Control**, arrow down to backlight the **System Setup** selection, and press the SELECT button to bring up the main menu.

SYSTEM SETUP Sub-Menu



3. Using the **Menu Control**, arrow down to backlight the **Keys** selection, and press the SELECT button to bring up the configuration menu.



4. For the desired **Function Key (F1 – F4)** selection, select the **MICROPHONE** function from the *pull-down* menu

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

5. To save the Function Key assignment, select **APPLY** from the main menu, and press the **SET** key to save new setting.

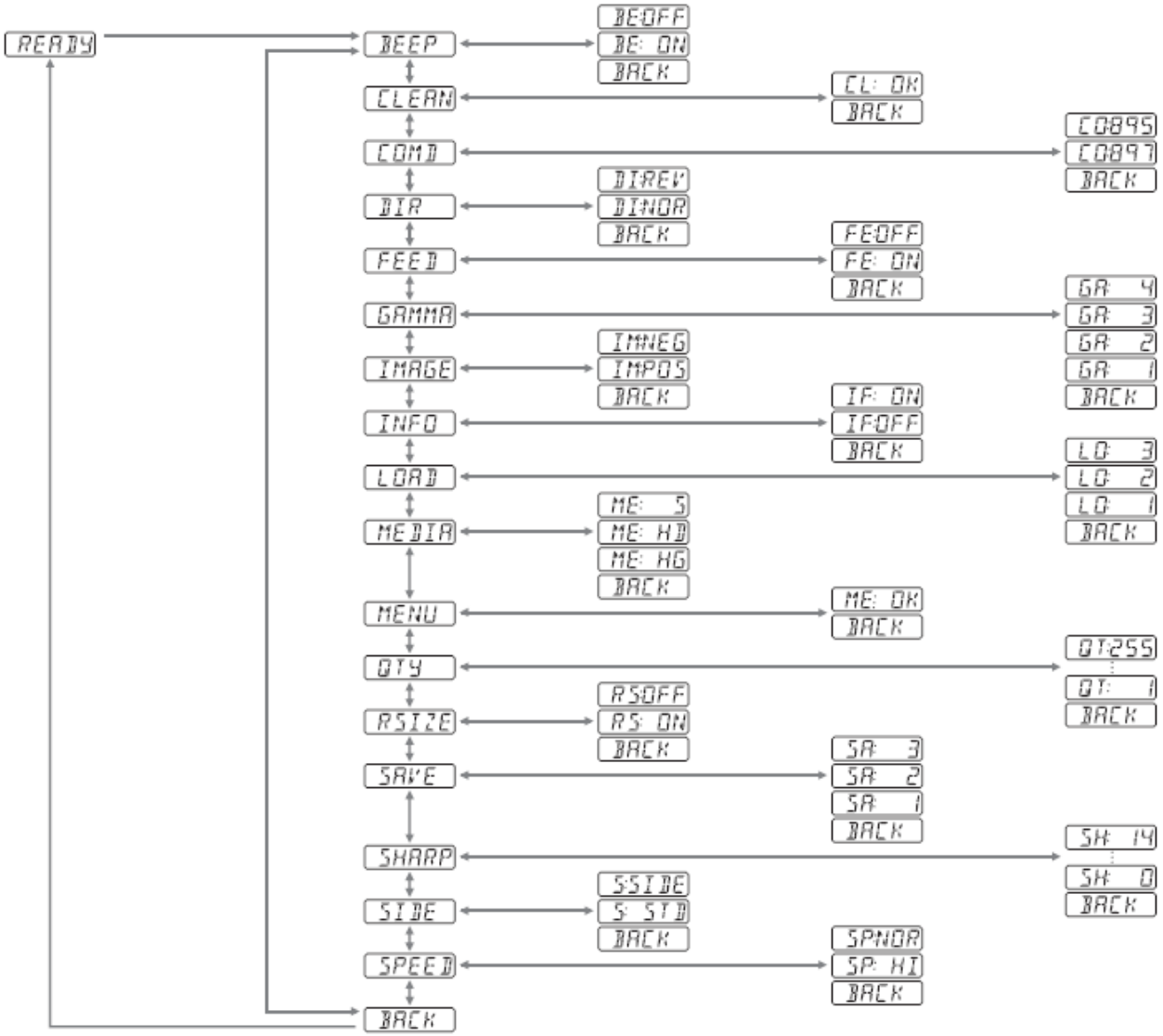
15.3 SONY UP-D897 USB Digital Printer

15.3.1 Procedure Notes:

The intent of this procedure is to provide instructions, for use in the field, for the setup of the SONY UP-D897 Digital (USB 2.0) B/W Printer, on a SmartCart or *mini*Cart.

15.3.2 Installation/Setup Procedure:

Sony UP-D897 Printer Configuration Menu Flowchart



"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

STEPS:

1. Following the steps below, using the front panel display menu and **Jog Dial** control, configure the initial user settings on the UP-D897 printer to match those shown in Figure 1, on the following page.

"LOCK"ALERT

*The MENU operations on the Sony UP-D897MD printer have a special hidden "**LOCK**" function that if active will completely disable making any changes to the menu settings on the printer.*

*IF the printer is currently in a "LOCKED" mode, a message "**LOCK**" will appear in the menu display and an alarm "Beep" will occur, when attempting to make any menu changes.*

To toggle the "LOCK" function on/off, do the following:

1) *Power OFF the printer*
2) *Press and **Hold** the **Jog Dial** (push/enter) switch*
3) *Power ON the printer, while keeping the Jog Dial switch depressed until one of the two messages listed below appear in the display menu. Repeating this power cycling process will toggle between the lock/unlock state.*
   - *"UNLOCK"*
   - *"LOCK"*

2. To bring up the setup MENU, "Press" the **jog dial** control (labeled "PUSH ENTER").
3. Use your finger to "Roll" the **jog dial** control until the desired setting for configuration is shown in the display window.
4. "Press" the **jog dial** control to select the offered setting for modification.
5. "Roll" the **jog dial** control until the desired value is displayed in the window.
6. "Press" the **jog dial** control to store the displayed value as the new setting.
7. Repeat the above "Roll"/"Press" steps for configuring each of the remaining user settings into the UP-D897.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

IMPORTANT: To SAVE all of the newly configured settings, it is necessary to do the following steps:

8. "Roll" the **jog dial** until "**SAVE**" is displayed in the setup menu window.

9. "Press" the **jog dial** control, and then "Roll" it to select which one of three possible user setup types (1, 2 or 3) you wish to save.

10. "Press" the **jog dial** to save the desired user settings type

11. To manually exit out of the setup MENU, "Roll" the **jog dial** until "**BACK**" is displayed in the setup menu window, and then "Press" the **jog dial**.

NOTE: The setup menu will exit, and automatically return to the normal "Ready" printer state, when no new user actions are made on the **jog dial** for approximately 20 seconds.

#	Setting Name	Description	Zonare Recommended Value
1	BEEP	Audible Tone	ON
2	*CLEAN*	*Initiate head cleaning operation*	*n/a – control action in menu*
3	COMD	Selects printer driver version	897
4	DIR	Direction (start top or bottom, for printing)	NORMAL
5	FEED	Added gap between prints	ON
6	GAMMA	Gamma curve (print density)	4
7	IMAGE	Positive or Negative printout	POS
8	INFO	Printing of user settings on prints	OFF
9	*LOAD*	*Loads stored settings 1, 2 or 3 into use*	*n/a – control action in menu*
10	MEDIA	Paper type	HG
11	*MENU*	*Prints out current user settings to paper*	*n/a – control action in menu*
12	QTY	Number of copies to print	1
13	RSIZE	*Selects image enlargement to paper size*	*ON*
14	*SAVE*	*Saves settings (as user 1, 2 or 3)*	*n/a – control action in menu*
15	SHARP	Sharpness: Image tuning (1-15)	4
16	SIDE	Image rotation (Up or 90 degrees)	SIDE
17	SPEED	Print speed	NORMAL

Figure 55: Menu Settings (UP-D897)

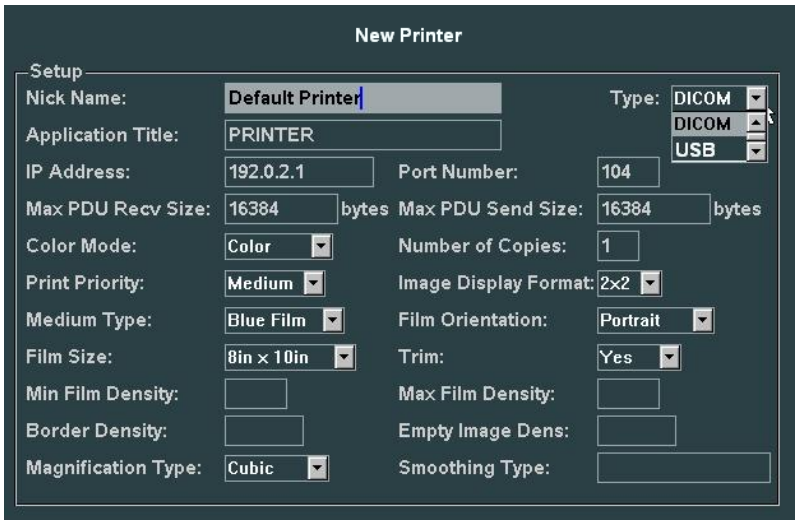
"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

15.3.3 Printer Menu Configuration Process:

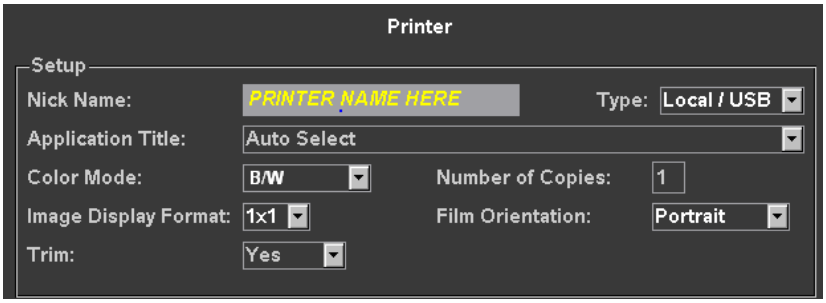
STEPS:

1. Access the **New Printer** menu, using the path

   System Setup->Archive->DICOM->Printers->New



2. Using the pull-down menu, under the "TYPE" selection, select the **USB** printer. The menu will change to the limited setup page for a USB style printer (as shown below)



3. Type into the "Nick Name" field, the name of the printer: "SONY UP-D897"
4. Set other print parameters as desired.
5. Select "APPLY" from the main menu, to save the changed settings

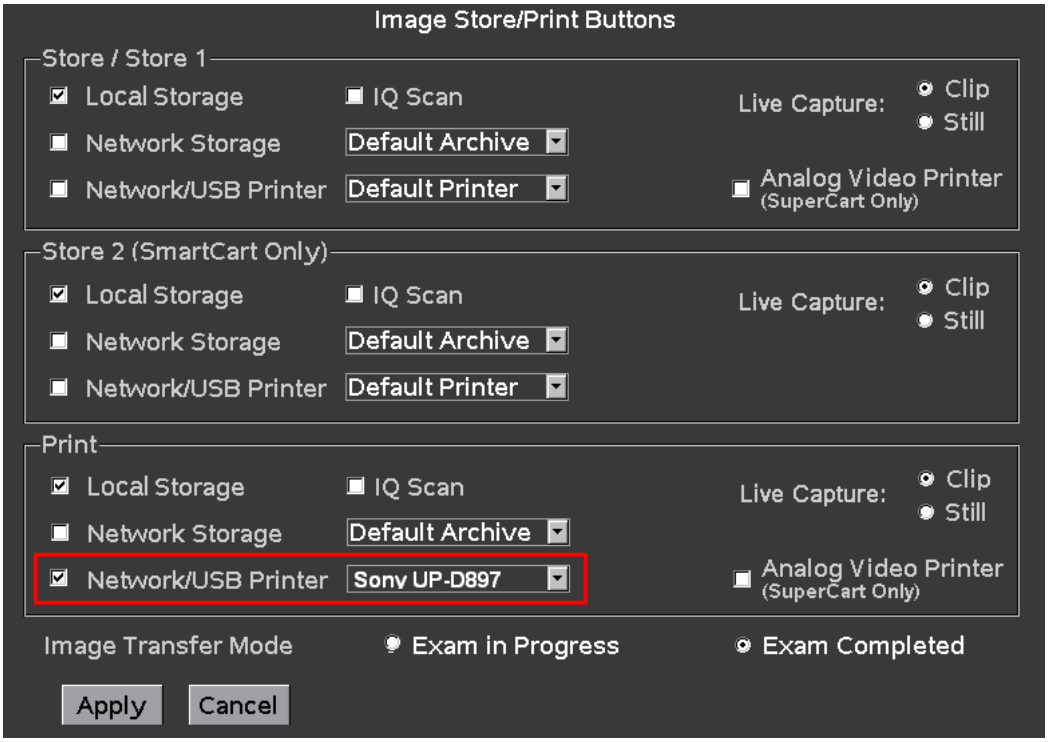
15.3.4 Print Button Configuration (Trigger):

STEPS:

1. Access the Print/Store Button configuration screen, using the path

   System Setup->Archive-> Store/Print

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



2. Under the "**Network/USB Printer**" function for the "**Print**" button, check the box to the left of the drop-down menu, enable this function
3. In the drop-down menu for this function, select the "***SONY UP-D897***" selection
4. Select "APPLY" from the main menu, to save the changed settings

---

Operator Controls

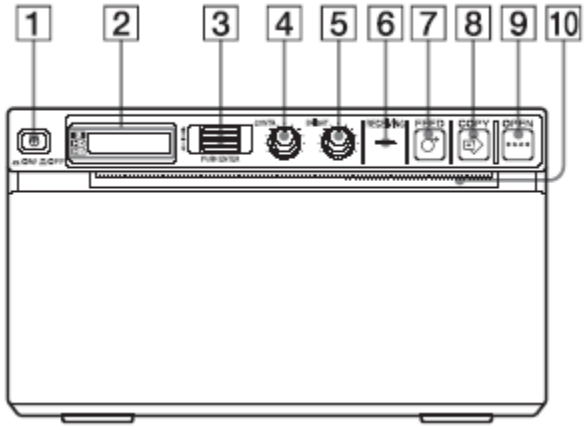


Figure 56: Operator Controls (UP-D897)

1 Power ON/OFF Switch

2 Printer Window LCD Display

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

3 JOG Dial (menu control)

4 CONTRAST

5 BRIGHTNESS

6 RECEIVING (indicates active print data transfer)

7 FEED (one-time push feeds paper, or holding during print cancels job)

8 COPY (prints another copy of previously transferred image)

9 OPEN (one-time push opens paper door, or holding during print cancels job)

10 CUT (cuts paper after image is printed)

15.3.5 Print Verification:

STEPS:

1. Power on the *mini*Cart, and the UP-D897, and connect a transducer.
2. **FREEZE** the image. Verify a printed image is produced when the "**Print**" key on the Scan Engine is depressed.

NOTE: *Refer to the SONY UP-D897 Operators Manual, for detailed information on proper operation of this device.*

15.3.6 Printer Status Message Decoding:

SONY UP-D897:

Message	Status	Action
DOOR	- The paper door is open	- Close paper door until it is locked securely
EMPTY	- Out of paper	- Add paper
COOL	- Print head thermal limit reached	- Allow the printer to cool. Normal printing will resume when message disappears, and thermal print head has cooled.
WAIT	- Printer is busy	- Wait of internal processing to complete

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

15.4 SONY UP-D25MD Color Printer

15.4.1 Installation Notes:

SPECIAL NOTE

The Sony UP-D25MD Color Printer is oversize and is therefore not a peripheral that can be "mounted" within the chassis of the Z.ONEUltra. A separate external location (rolling cart, tabletop, etc) must be made available for storing of this printer.

The system software on the Z.ONE*Ultra* system contains the necessary drivers to support operation and printing to the Sony UP-D25MD Color Printer.

The information provided below covers the basic menu setup on the Z.ONE*Ultra* , to enable printing to this device.

15.4.2 Setup Procedure:

STEPS:

1. Identify the dedicated work area, within reach of the Z.ONE*Ultra*, for placement of the Sony UP-D25MD printer and setup the printer in that location.
2. Power off the Scanner and Cart.
3. Attach the USB cable between the Sony UP-D25MD Color Printer and one of the USB ports on the rear of the Z.ONE*Ultra*.
4. Connect the AC power cable to the rear panel power plug of the UP-D25MD labeled "AC IN."
5. Apply power to the system and printer.
6. Under the **ARCHIVE** -> **DICOM** -> **PRINTERS** page, create a new "**Local/USB**" type printer entry for the Sony UP-25MD printer
7. Enter in "**Sony UP-D25MD**" to the *Nick Name* field of the printer configuration page
8. Enter in the desired printer settings, from those offered in the on-screen menu, and then select "APPLY" to save.
9. Under the **ARCHIVE** -> **STORE/PRINT** page, configure the Z.ONE*Ultra* "**Print**" button for triggering a print to the Sony UP-25MD printer.
3. Connect a transducer to the Z.ONE*Ultra*. Wait for startup to complete and image to be shown.
4. Press the **"FREEZE"** key to capture an ultrasound image.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

5. Verify a printed image is produced on the UP-D25MD when the "**Print**" key on the SmartCart is depressed.

NOTE: *Refer to the SONY UP-D25MD Installation Procedure (P/N S00119), or Operator Manual from SONY, for detailed information on proper operation of this device.*

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

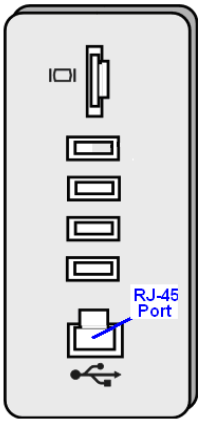
15.5 HP LaserJet Network (REPORT) Printer

15.5.1 Procedure Notes:

The intent of this procedure is to provide instructions, for use in the field, for setup and use of a Post Script-3, ***PS3*** (or above) style, HP LaserJet Network Printer, for OB, Vascular, or Cardiac ***Report*** printing, on a Z.ONE*Ultra*.

NOTE: *The following key limitations regarding the use of the HP LaserJet Color Printer on the* Z.ONE*Ultra product should be noted.*

- *The HP LaserJet color printer is ONLY used for reporting of OB/GYN report pages (NO ultrasound image printing).*
- *The HP LaserJet printer is NOT a device that is mountable to either the SmartCart or miniCart units. It will require a remote cart or remote shelf for use.*



SmartCart Cable Connection

- **Initial Setup – Network Connection Method:**

STEPS:

1. Connect the AC power cord to the printer, and the other end to an active AC Power outlet
2. Connect one end of the network crossover cable to the HP LaserJet printer, and the other end to the Ethernet (RJ-45) port on the Z.ONE*Ultra*.
3. Power on the HP LaserJet printer

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4. Open the paper tray on the printer, and install the desired paper.
5. Power on the Z.ONE*Ultra*

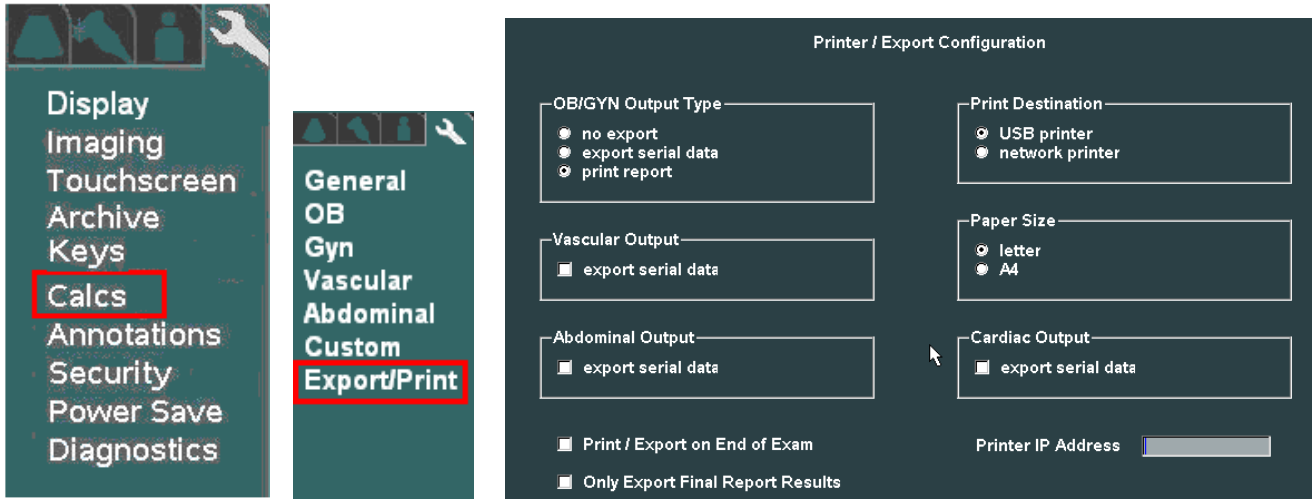
- **Report Printing Configuration – on** Z.ONE*Ultra***:**

In order to utilize this Report printing capability, it is necessary to pre-configure the Export/Print setup parameters, within the "CALCS" sub-menu, as part of the System Setup operations. The following steps and menus are used for the setup of this Report Exporting/Printing function.

STEPS:

1. Go to the Printer/Export configuration screen, by selecting the following sequence:

   System Setup -> Calc -> Export/Print



Printer/Export Configuration (Calc Reporting)

2. To configure the system for printing of the desired type (OB, Vascular) reports to the HP LaserJet , select the following:
   - OB/GYN Output Type:..... **PRINT REPORT**
   - Printer Destination:..... **NETWORK PRINTER**
   - Paper Size: ..... **LETTER**
   - Printer IP Address: Enter printer's assigned IP (potentially 192.168.1.1)
   - Print/Export on End of Exam: (as desired by User)
   - Only Export Final Report Results: (as desired by User)
   - Select "APPLY" in the menu, to save the settings

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

NETWORK Installations Only:

To meet regulatory requirements for user safety, Ethernet "Network" connectivity is the only method recommended for attaching the HP LaserJet printer to the Z.ONE*Ultra*.

In this configuration a direct cable connection will be used between the printer and the Z.ONE*Ultra* (using a "crossover cable"). The generic IP Address setup in the printer will need to be entered into the corresponding report printer configuration page on the Z.ONE*Ultra*.

To find out the IP Address currently setup as a factory default in the HP LaserJet printer, perform the following steps:

STEPS:

1. With the printer powered ON, the Z.ONE*Ultra* powered ON, and the crossover cable connected between the two devices, perform the following step.
2. On the HP printer, press and **hold** (for 5 seconds), the "**GO**" button
3. A series of pages of internal configuration information about the printer should print out.
4. Check the **IP Address** value that appears on the Networking Info page
5. Enter this value into the **PRINTER IP ADDRESS** field, on the Export/Report Configuration page on the Z.ONE*Ultra*

   ***NOTE**: For configurations where printer is being attached to an existing DICOM network that is running on the* Z.ONE*Ultra, the IP Address assigned by the IT Administrator of the network at the site will need to provide this IP Address. This IP Address will need to be setup using the HP Toolbox setup software on a PC, that is temporarily connected to the HP LaserJet printer. That IP Address will also have to be entered in the Export/Print configuration page on the* Z.ONE*Ultra.*

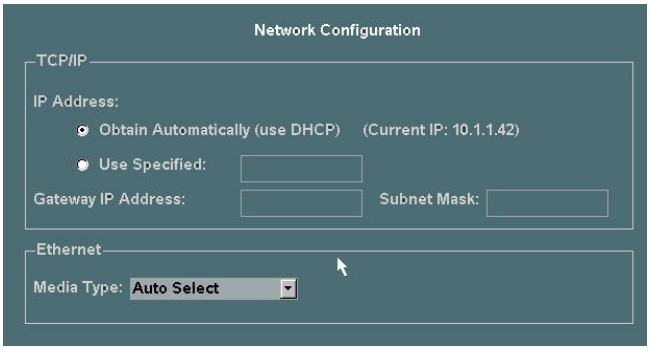
   In order for the Z.ONE*Ultra* to communicate with the HP LaserJet printer, it must be on the same subnet. This is accomplished by programming an IP Address into the Z.ONE*Ultra* (on the **System Setup** -> **Network** page) that is one value greater then the IP Address of the HP LaserJet printer.

   To configure this IP Address into the Z.ONE*Ultra*, follow the steps below.

6. Go to the "NETWORK CONFIGURATION" page on the Z.ONE*Ultra* by executing the following sequence:

   System Setup ->Archive-> Network

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



Network Configuration Page

7. Using the arrow cursor and SET key, check the box for "***USE SPECIFIED***"
8. In the data entry box to the right of the "***USE SPECIFIED***" checkbox, enter in an IP Address that is one greater then the value of the HP LaserJet printer (i.e printer: **192.168.1.1**, Z.ONE*Ultra*: **192.168.1.2**)
9. Select "**APPLY**", to save the settings

Printing Reports:

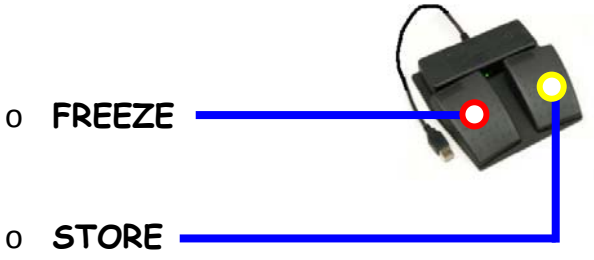
1. Perform the desired calculations and measurements on the Z.ONE*Ultra*.
2. At the conclusion of the measurement process, to manually trigger the print of an Report, select the "**PRINT**" softkey, in the **Calculations**->**Report** page
3. IF the Report printing was configured for "Print at end of exam", the Report will automatically be output to the HP LaserJet, upon ending the current exam.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

15.6 2- Pedal Footswitch

15.6.1 Information:

An optional USB-style remote footswitch is available for use on the system, to enable the User to initiate several normal user operations, while their hands are previously occupied in the scanning of the patient. The two normal user interface buttons/functions that are assigned (not programmable) for optional footswitch control; are as follows:



The footswitch connects to the system using a USB port on the rear of the Cart, and is a “plug-n-play” device that does not require any menu configuration on the system to operate.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

16 SOFTWARE PROCEDURES

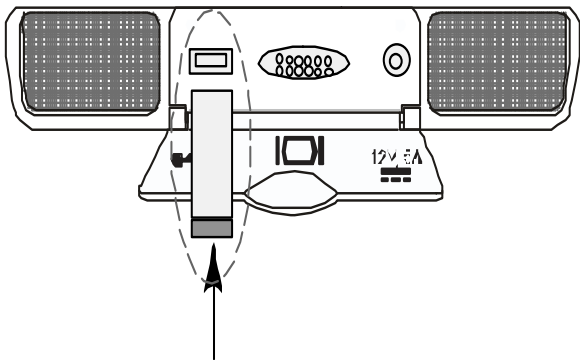
16.1 SCAN ENGINE: Standard Software Installation/Upgrade Procedure

CAUTION

If performing software upgrades with the Scan Engine out of the Cart (un-docked) it is extremely important to ensure that the battery has a minimum of 50% charge capacity, PRIOR to beginning this software upgrade procedure.

If the charge is too low, either replace the existing battery with a properly charged one, or temporarily dock the Scan Engine in the Cart, (with the Cart's having AC power applied and the circuit breaker in the "On" position) long enough to achieve a fully charged state.

1. Connect a transducer to the Scan Engine (if not currently attached)
2. Press the Power On/Off button to power the system on
3. Allow the system to complete a normal boot operation (less then 1 minute)
4. Open the rear access door on the Scan Engine, and insert the USB Memory Stick (containing system software installer files) into the USB port, pressing lightly to ensure it is seated in the connector

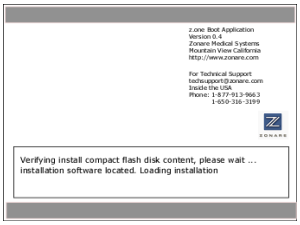


5. An initial software install alert message screen should appear on the LCD display
6. To begin the software install process, at each of the two (2) alert screens, press the "SELECT" key

NOTE: *If it is determined that the software revision of the USB Memory Stick is not the desired version for installation, and it is desired to abort (select the "NO" option) the install operation (or abort it for any other reason), press the "BACK" key, then manually remove the USB Memory Stick..*

6. The following initial software installation screen should appear, and be displayed for a few seconds on the LCD Display

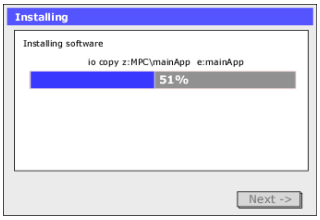
"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



7. A final "***Welcome to Install***" screen should appear

Welcome to Install
Welcome to Zonare Software Install
This program will install the following piece of software:
supernova X_X_XXX
Click "Next" or any key to begin install process
Next ->>

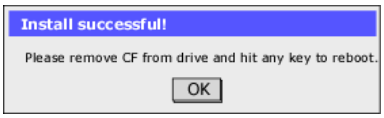
8. Press the "SELECT" key again to begin the software installation process.
9. The in-process installing status screen should appear, with a bar graph indicating a dynamic percent completion status



NOTE: *The main application install process should complete in approximately 5 minutes.*

10. After file installation is completed, the system will run a brief install verification process. The following screen will appear during this verification

11. At the completion of a successful software installation/verification process, a dialogue box with the following message should appear on the LCD Display screen



12. Remove the USB Memory Stick from the Scan Engine.

7. Press the "SELECT" key again to finalize the software installation. The Scan Engine should perform an automatic reboot, powering back up in a fully operational condition.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

16.2 SCAN ENGINE (Only) "Ad*vanced"* Software Installation Procedure

SPECIAL INFO

– *In cases where the revision level of the software on the* Z.ONE*Ultra is being transitioned in a non-standard fashion, or has become corrupted and the system will not boot to perform a normal software installation process, the following advanced software installation steps should be used.*

16.2.1 Interrupting the normal boot sequence (*"Alternate Boot Options"*):

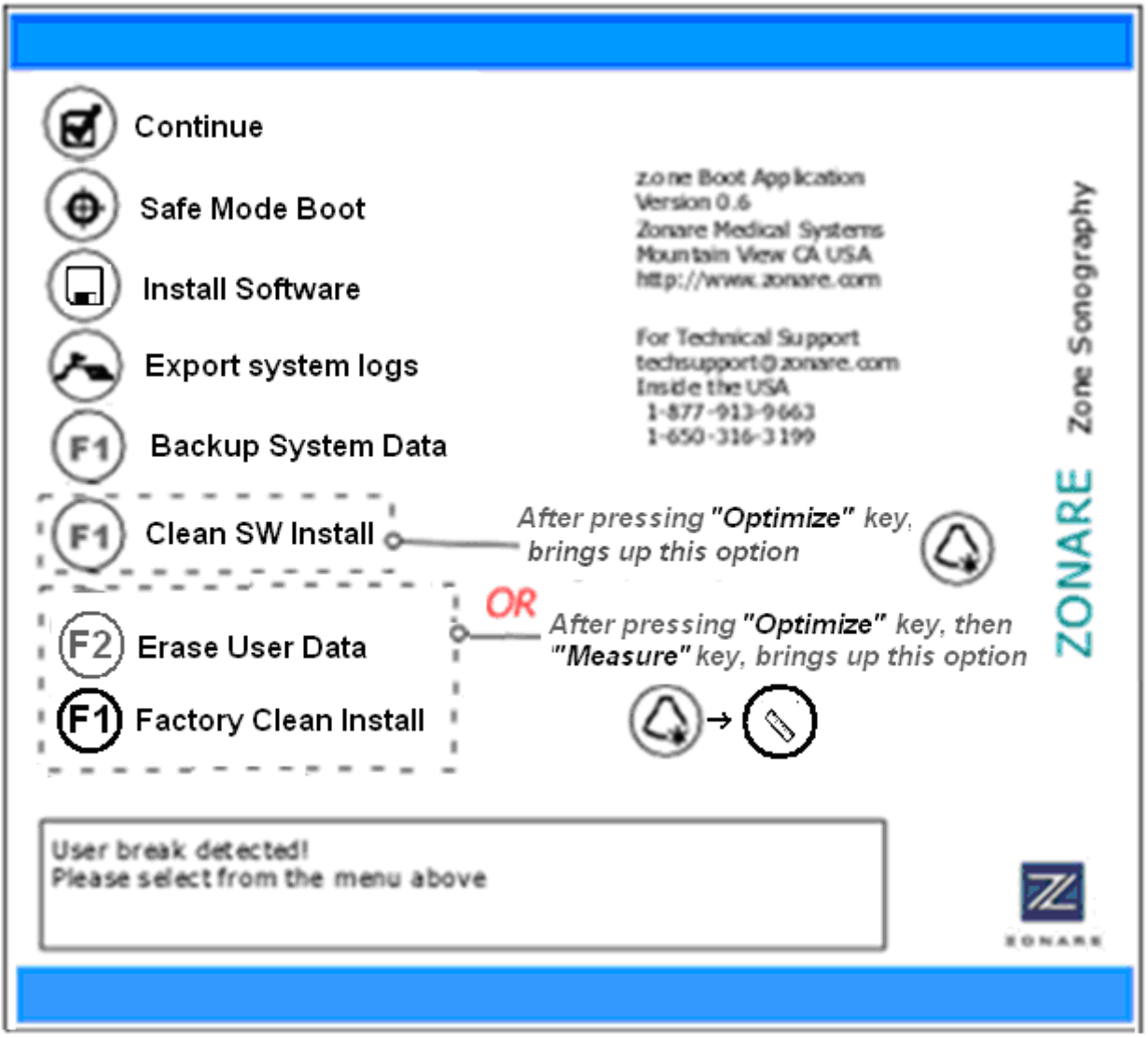
1. Connect a transducer to the Scan Engine (if not currently attached)
2. Press the green power button, on the left-rear of the Scan Engine, and then IMMEDIATELY abort the normal boot sequence by pressing the "**Freeze**" key, within a few seconds after pressing the power button, and the start-up splashscreen first appearing.

NOTE: The "**Back**" key also performs this function, if it is accessible due to the Scan Engine being undocked or docked in a *mini*Cart

3. The Scan Engine should abort the normal boot, and display a screen (shown below) offering a variety of options.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

16.2.2 Advanced Install Operations: (4.0.x & > Software)



SPECIAL NOTE: Pressing one of the following keys on the keyboard of the Scan Engine (or SmartCart if Scan Engine is "docked"), will bring up additional key functions into the on-screen menu (as shown above)

- Pressing the **OPTIMIZE** key will assign **F1** to: "***Clean SW Install***"
- Pressing the **OPTIMIZE** key, then pressing the **MEASURE** key, will assign the **F2** key to: "***Erase System Data***""

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Description of Key Functions

Key	Function	Operation Performed
Select	Continue	Pressing this key will clear a previously setup "Safe Mode Boot" state, and reboot system to normal operating mode.
Set	Safe Mode Boot	Puts system in a mode where transducer imaging will be disabled upon power up.. Requires rebooting, returning to BootApp screen, and selecting "Continue" (above) to return to normal scanning.
Store	Install Software	Installs software from USB Memory Stick, retaining all existing User Presets and System (configuration) Presets (by automatically backing up to USB Memory Stick, prior to installing new software).
Tab	Export system logs	Copies content of internally stored system LOG files, to externally inserted USB memory stick
	Backup System Data	Moves the contents of the internal exam archive storage (Patient Exams) to the currently attached USB Memory Stick.

Description of Optional Hidden Functions – *(4.0.x & > Software)*

Key	Function	Operation Performed	Access Key(s)
	Clean SW Install	Installs software from USB Memory Stick, over-writing (erasing) existing User Presets and System (configuration) Presets, with Zonare default values. NO formatting of the media is performed.	*Optimize*
	Factory Clean Install	The "C" and "D" partitions of the internal media of the Scan Engine/Scan Module are completely reformatted (all content erased), as a precursor to installing system software from USB Memory Stick. As in the normal Clean Install, this process erases all existing User Presets and System (configuration) Presets; replacing them with Zonare default values. **WARNING**: In addition, this "**Factory**" Clean Install also erases all Archived exams ("C" partition), and hence should NOT be performed unless all Exams have been previously exported or sent to PACS.	*Optimize -> Measure*
	Erase User Data	Completely erases **ALL** stored patient exams (Image ARCHIVE). Additionally erases all entries in the DICOM Queue and LOG file directory, on the internal CompactFlash media inside the Scan Engine/Scan Module.	*Optimize -> Measure*

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

16.3 SCAN MODULE: Standard Software Installation/Upgrade Procedure

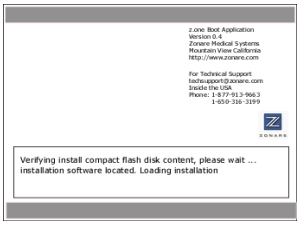
ATTENTION

The Scan Module MUST be docked in the Cart in order to perform a Standard (user setting auto backed-up/restored). Any software install performed with the Scan Module undocked, will execute as a "Clean" install process (no user settings retained).

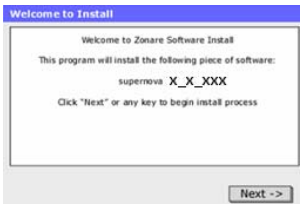
1. Connect a transducer to the Scan Module (if not currently attached)
2. Press the Power On/Off button to power the system on
3. Allow the system to complete a normal boot operation (less then 1 minute)
4. Insert the USB Memory Stick (containing system software installer files) into any one of the four USB ports at the rear of the SmartCart, pressing lightly to ensure it is seated in the connector
5. An initial software install alert message screen should appear on the LCD display
6. To begin the software install process, at each of the two (2) alert screens, press the "SELECT" key

NOTE: *If it is determined that the software revision of the USB Memory Stick is not the desired version for installation, and it is desired to abort (select the "NO" option) the install operation (or abort it for any other reason), press the "BACK" key, then manually remove the USB Memory Stick..*

13. The following initial software installation screen should appear, and be displayed for a few seconds on the LCD Display



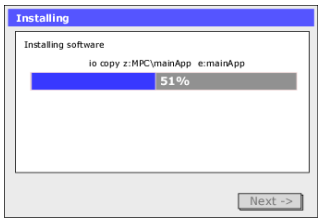
14. A final "***Welcome to Install***" screen should appear


Welcome to Install
Welcome to Zonare Software Install
This program will install the following piece of software:
supernova X_X_XXX
Click "Next" or any key to begin install process
Next ->>

15. Press the "SELECT" key again to begin the software installation process.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

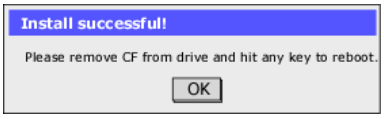
16. The in-process installing status screen should appear, with a bar graph indicating a dynamic percent completion status



NOTE: *The main application install process should complete in approximately 5 minutes.*

17. After file installation is completed, the system will run a brief install verification process. The following screen will appear during this verification

18. At the completion of a successful software installation/verification process, a dialogue box with the following message should appear on the LCD Display screen



19. Remove the USB Memory Stick from the Scan Engine.

20. Press the “SELECT” key again to finalize the software installation. The Scan Engine should perform an automatic reboot, powering back up in a fully operational condition.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

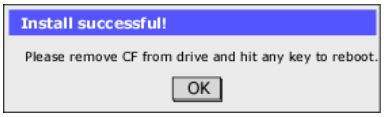
16.4 SCAN MODULE: "Clean" Software Install Procedure ("SERVICE" key)

1. Press the Power On/Off button to power the system on
2. Allow the system to complete a normal boot operation (less then 1 minute)
3. Insert the USB Memory Stick (containing system software installer files) into any one of the four USB ports at the rear of the SmartCart, pressing lightly to ensure it is seated in the connector
4. Pressing the "**SERVICE**" key, on the upper row of the QWERTY keyboard on the SmartCart, will immediately bring up the main **User Diagnostic Panel** page.

5. Select the "**MAINTENANCE**" softkey option, to bring up that page.
6. Select the "**SERVICE REBOOT**" softkey. The system will shutdown, and reboot into the special BOOT-APP option screen
7. Press the "**OPTIMIZE**" key, to enable the "***CLEAN INSTALL***" option to appear in the menu.
8. Press the "**F1**" key, to begin the Clean software install process.
9. At each of the two (2) alert screens, press the "SELECT" key to continue through the install operation to completion.

   NOTE: *If it is determined that the software revision of the USB Memory Stick is not the desired version for installation, and it is desired to abort (select the "NO" option) the install operation (or abort it for any other reason), press the "BACK" key, then manually remove the USB Memory Stick..*

10. At each of the two (2) alert screens, press the "SELECT" key to continue through the install operation to completion.
11. At the completion of a successful software installation/verification process, a dialogue box with the following message should appear on the LCD Display screen



"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

12. Remove the USB Memory Stick, and press the “SELECT” key again to finalize the software installation. The system should perform an automatic reboot, powering back up in a fully operational condition

16.5 SCAN MODULE: “Clean” Software Install Procedure (Undocked or Auto-Load)

ATTENTION

The Scan Module requires connection to an (optional) AC Power Adapter in order to be operated for software installation while in an “undocked” (outside of the Cart) condition.

This same auto-load “Clean software install method can be performed with the scan module docked in the Cart. In that configuration the scan module will get its power from the Cart

All software installations performed while in a “standalone” mode, will automatically be executed as a “Clean” install (no user settings backed-up/restored). All user Presets and System settings MUST have been backed-up to USB Memory Stick, PRIOR to performing this form of software installation on the Scan Module.

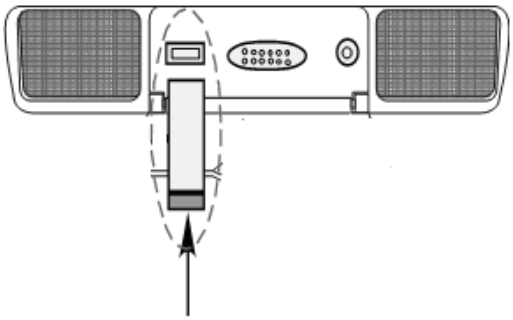
1. Attach a Zonare AC Power Adapter (option) to the DC power input port on the rear of the Scan Module, or have the Scan Module physically docked on Scanner Deck of SmartCart.
2. IF Scan Module is being powered by docking it in the SmartCart, make sure that AC is power present at rear of Cart, and the circuit breaker in the “**1**” / ON position (or Z-PAK battery pack is installed in system)

   NOTE: The Cart will NOT be actively “turned on” (power button on Scanner Deck will **NOT** be pushed) during this direct Scan Module “Clean” software installation.

3. Insert the USB Memory Stick (containing system software installer files) into the USB port at the rear of the Scan Module, pressing lightly to ensure it is seated in the connector

   NOTE: IF the USB Memory Stick type being used is too long to fit in the clearance between the back of the Scan Module and the gray plastic rear panel on the Cart, place a flat-blade screwdriver under the sliding panel, to raise it up a sufficient distance to allow clearance.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



4. Press the Power ON/OFF button on the Scan Module, and allow it to power up.
5. The LED on the USB Memory Stick will begin flashing, to indicate the start of the software installation process.
6. The LED will intermittently continue to flash during the entire duration of the software installation.

   - **DO NOT** interrupt or power off the scan module at any time until the installation is complete!

     - Total install time: **Approx 8 minutes**
7. The Scan Module will automatically power off (and remain off), to indicate the completion of the software installation.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

16.6 FTP Site Access: Software/File Downloads from Zonare

SPECIAL INFO

- *Zonare's "TECH SUPPORT"FTP site area is provided to enable global access by Customers, Distributors, and Service personnel.*
- *This tool is intended to allow direct access for downloading of file provided by Zonare Tech Support, (like downloads of new System Software).*
- *The TECH SUPPORT FTP area is also provided as a repository for transferring (uploading) files to Zonare Tech Support (i.e. image files for review).*
- *To ensure security, a User Name and Password are required.*

For Customers/Distributors/Service:

1. Go to the START box at the bottom of the screen of your PC and start up ***Wiindows*** "Explorer".
2. Enter the following URL information into the "ADDRESS" box of Windows "Explorer":

   Address: **ftp://12.40.200.87**
3. Enter the following User Name and Password information:

   User Name: (call Tech Support for current login information)

   Password: (call Tech Support for current login information)
4. Tech Support window should now be displayed, enabling uploading or downloading of files

---

16.7 "DIAGNOSTIC" Panel Operations

16.7.1 Foreword

The **User Diagnostics Panel** allows service personnel access to important system information and the ability to perform service support processes.

16.7.2 Accessing the basic "Diagnostic" Panel

SERVICE Key- Quick Method:

1. Pressing the "**SERVICE**" key, on the upper row of the QWERTY keyboard on the SmartCart, will immediately bring up the main **User Diagnostic Panel** page.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

NOTE

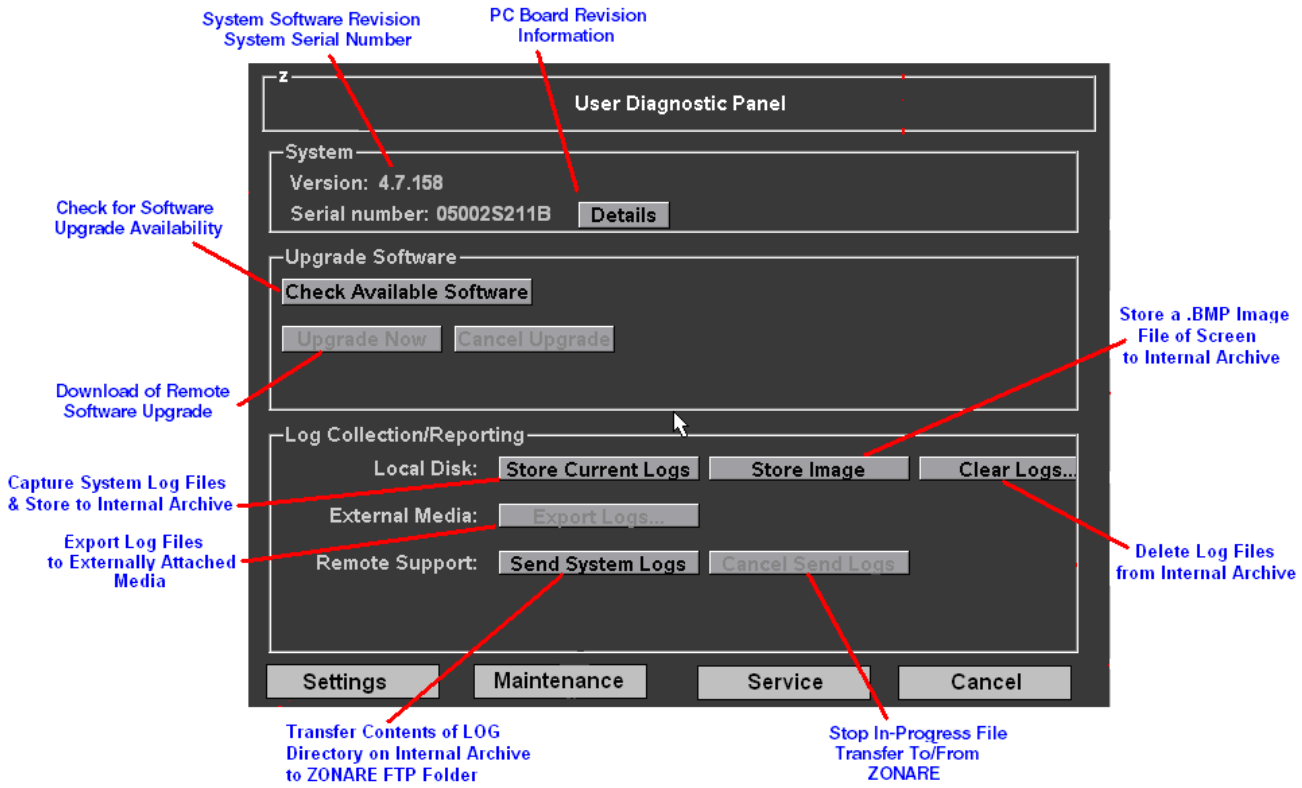
– *EXTENDED "**Serivce**"key press will initiate an immediate manual capture of system "LOG" files.*

Normal Menu Path Method:

1. Using the "***Tab***" button and ***Menu Control*** on the Scan Engine (or SmartCart) user interface, advance to the "***Tools***" menu and then sequence through the following selection:

   Tools tab **--> System Setup --> Diagnostics**

2. Press the "SELECT" button on the user interface to access to the basic "**Diagnostic**" page



"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

The three (3) sub-menus offered from **User Diagnostic Panel** are as listed below:

- **SETTINGS** ..... FTP Site Access Setup
- **MAINTENANCE** ..... Firmware Upgrades / Battery Maintenance/Xducer Testing
- **SERVICE** ..... Service-Key Password Entry

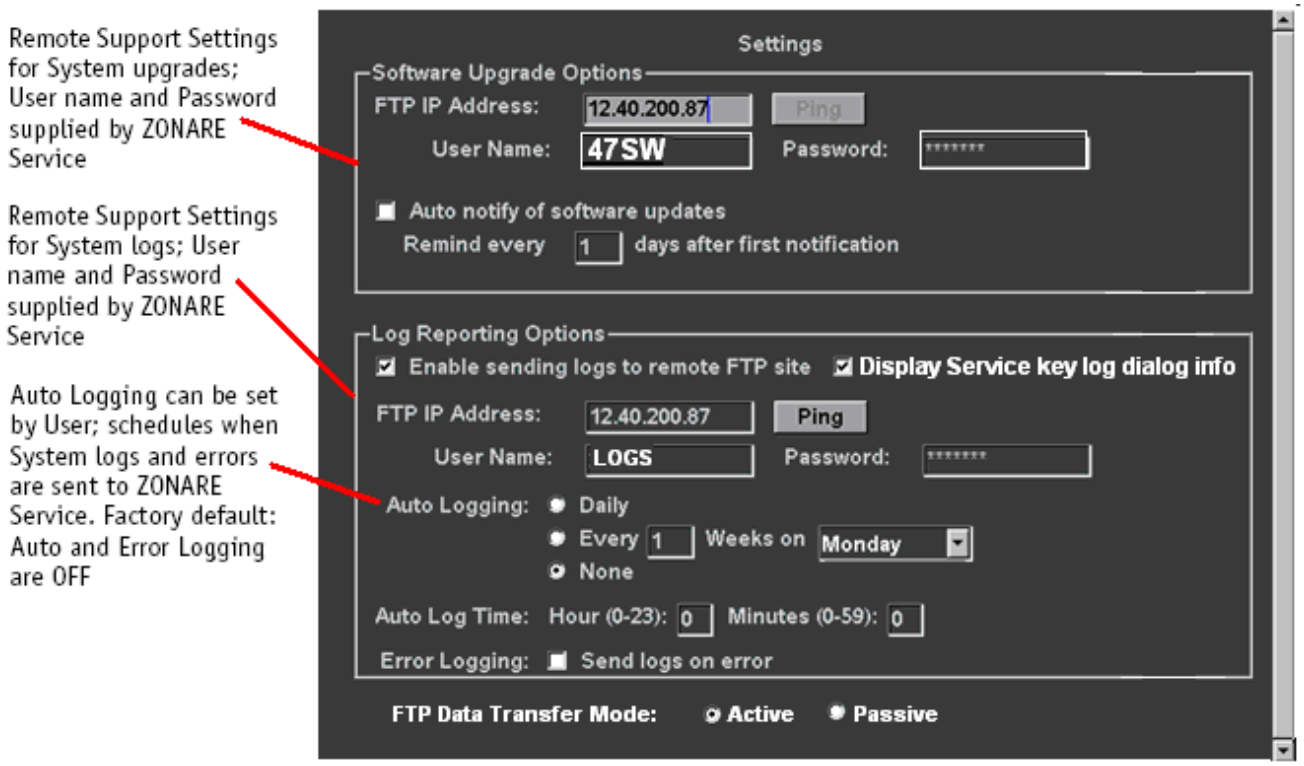
Functions provided within the **User Diagnostic Panel** are as listed below:

- Remote System Software Upgrades
- System Log file collection/reporting
- Checking of system software revision level
- Checking system serial number
- Checking revision levels of major PC boards in Z.ONE*Ultra*
- Reconditioning of the Z-PAK Battery in the SmartCart
- Upgrading of the firmware on the PIC in the power supply of the SmartCart
- Upgrading of the firmware of the FPGA on the Main Board of the SmartCart
- Upgrading of the firmware of the CW Module within the SmartCart
- Diagnostic testing of transducers
- Capturing of system status to a “LOG” files
- Exporting of “LOG” files from internal storage to the externally attached media device
- Capturing current image screen, and storing as a .BMP file to internal Archive
- FTP transferring the contents of the internal “LOG” directory (via an internet connection) to ZONARE
- Checking for availability of software upgrades from remote ZONARE FTP site
- Remote (over the internet) software upgrade of the Z.ONE*Ultra* from the ZONARE FTP site
- Forcing a system REBOOT, to the BOOT-APP screen (for Scan Module “Clean SW Installs”)
- Transducer analog channel “Diagnostic” testing
- Z-PAK cart battery detailed status information

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

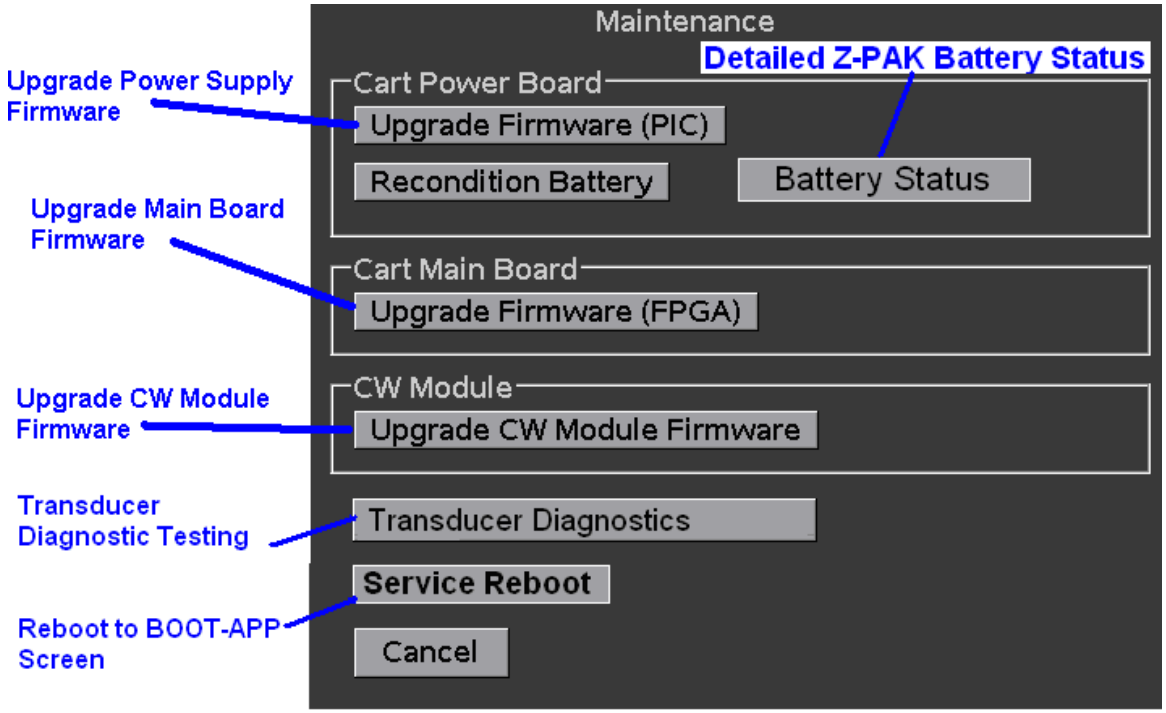
The additional functions available beyond the main page of the User Diagnostic Panel, in these three sub-menus, are as defined below:

- **SETTINGS**
  - FTP Access Setup – (IP Addressing)
    - Software Upgrades
    - Log File Transfer
  - Auto-Log File Reporting Configuration

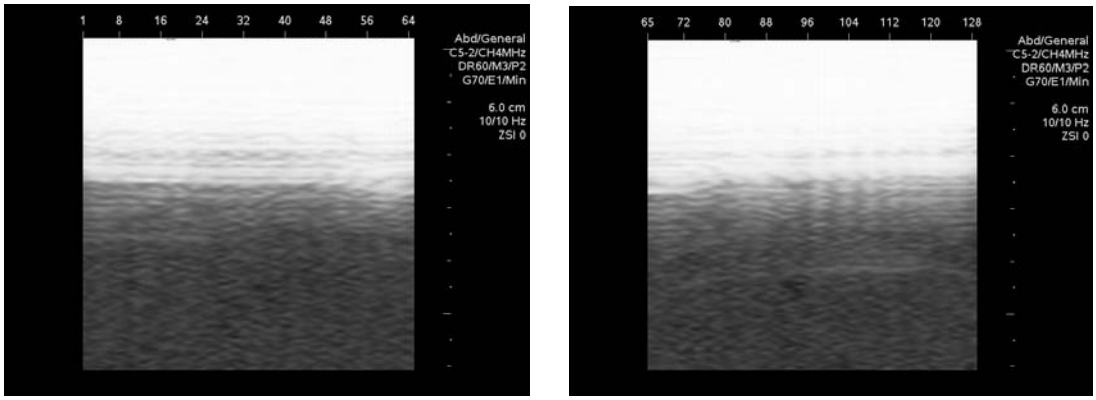

Remote Support Settings for System upgrades; User name and Password supplied by ZONARE Service
Remote Support Settings for System logs; User name and Password supplied by ZONARE Service
Auto Logging can be set by User; schedules when System logs and errors are sent to ZONARE Service. Factory default: Auto and Error Logging are OFF
Settings
Software Upgrade Options
FTP IP Address: 12.40.200.87
Ping
User Name: 47SW
Password: *******
Auto notify of software updates
Remind every 1 days after first notification
Log Reporting Options
Enable sending logs to remote FTP site
Display Service key log dialog info
FTP IP Address: 12.40.200.87
Ping
User Name: LOGS
Password: *******
Auto Logging: Daily
Every 1 Weeks on Monday
None
Auto Log Time: Hour (0-23): 0 Minutes (0-59): 0
Error Logging: Send logs on error
FTP Data Transfer Mode: Active Passive

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- **MAINTENANCE**
  - Firmware Upgrades – Z-PAK Maintenance – Scan Module SW Load (***Service Reboot***)

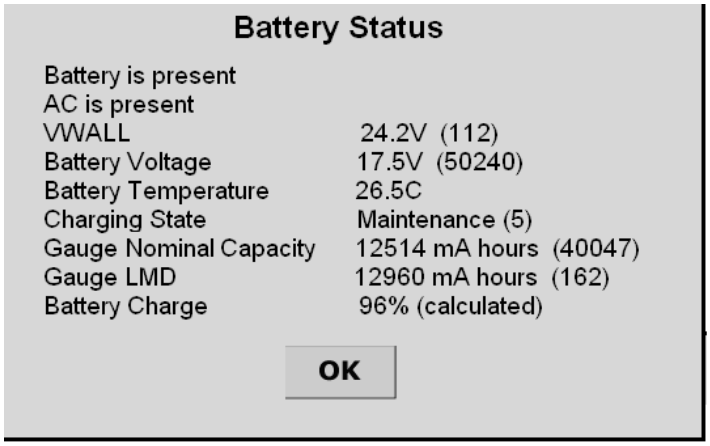


- **TRANSDUCER DIAGNOSTICS**
  - Displays a linear image format for all transducer types, to identify possible missing channels/elements.
  - Pressing the "**SET**" key will toggle between the two testing segment screens (element 1-64, 65-128), to cover all elements in the transducer under test.



"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

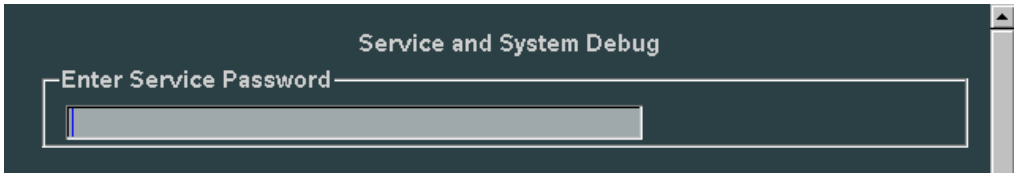
- **BATTERY STATUS**
  - Displays detailed Smartcart Z-PAK battery condition/status (as shown below).



Function	Definition	Normal Value/Range
VWALL	Output of the AC-DC Power Supply in Cart	**24V** ± 5% (only when AC present)
Battery Voltage	Present battery pack voltage	**14 to 21V**
Battery Temperature	Present Internal Temperature of the Z-PAK	**27°C / 0 to 45°C**
Charging State	Indicates present battery charging mode	OFF ---------- 0 SOFT_START ---------- 1 TOP_OFF ---------- 2 RAPID_CHARGE ---------- 3 TRICKLE ---------- 4 MAINTENANCE ---------- 5 RECONDITION ---------- 6 COOL_DOWN ---------- 7 DRIVE_DONE ---------- 8 RECONDITION_INIT ---------- 9
Gauge Nominal Capacity	Present estimated state-of-charge of Z-PAK	**0 to 15552mAh**
Gauge LMD	**LM**D = "***Last Measured Discharged***" Actual Z-PAK capacity as measured from last completed "RECONDITION" cycle, or full charge/discharge cycle.	**12960** nominal / ***10368 to 15552** *Below this range would be considered a 'bad' (needing replacement) battery. Above this range should be considered an invalid value.
Battery Charge	Estimated present charge capacity of Z-PAK, calculated using two values above.	**0 to 100%**

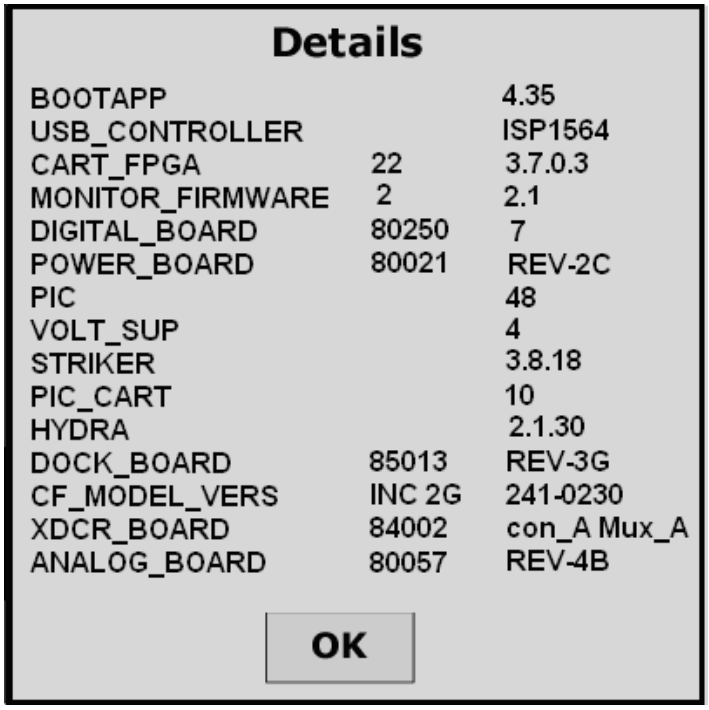
"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- **SERVICE**
  - Service Password (Enable Proprietary Function Access)



16.7.3 PC Board Version Information

1. Using the trackball, position the arrow cursor over the **DETAILS** box
2. Press the "SET" button on the user interface
3. A "**Details**" menu (similar to the one shown below) should appear, displaying current revision values programmed into the various PC boards in the Z.ONE*Ultra*



4. Press the "BACK" button to hide the "Details" menu

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

16.7.4 FTP Remote Access Configuration:

NOTE: *Normally these three parameters (IP Address, User Name, and Password) will already be configured properly into the entry boxes, as this is automatically setup at the time of initial software installation on the Scan Engine. You may therefore bypass this step initially, and only return to the configuration process IF it is found that the values entered are not allowing FTP access.*

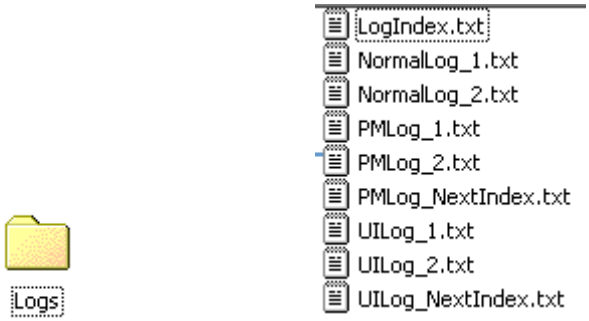
1. On the Diagnostic page, in the "ZONARE SUPPORT" area on the screen, ensure that the following FTP remote access parameters are configured for the proper serial number of the Scan Engine in the Z.ONE.
   - IP Address: (for Zonare FTP Site) **12.40.200.87**
   - User Name: ..... **47SW** or **LOGS**

     *- **47SW** for software upgrade field*
     *- **LOGS** for log reporting field*
   - Password:..... **support**

2. Using the ***Menu Control*** scroll down to backlight the **APPLY** selection, then press the "SELECT" button to save the updated settings

16.7.5 MANUAL Log File Capture (Store) – Download to ZONARE

1. Using the trackball, position the arrow cursor over the **Store Current Logs** box
2. Press the "SET" button to initiate the creation of the LOG directory and the writing ("Capture") of the log files to the internal CompactFlash storage media. The directory and files will look similar to that shown below:



3. Using the trackball, position the arrow cursor over the **Send System Logs** box, and Press the "SET" button to initiate the system log transfer

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

16.7.6 BRUTE-FORCE Log File Capture – (System Problem Condition)

Smartcart-Based:

1. Holding down (extended press for approx 5+ seconds) the "**SERVICE**" key, on the upper row of the QWERTY keyboard on the SmartCart, will result in manually generating the capture of a set of internal "LOG" files,

Standalone Scanner-Based:

2. Rapidly pressing in succession the following 3 keys on the scanner, will result in manually generating the capture of a set of internal "LOG" files,

SET key -> **MEASURE** key -> **PRINT** key

16.7.7 MANUAL Image File Capture (Store) – Download to ZONARE

NOTE: *The following process is used for capturing (and storing) an ultrasound image screen snapshot as a .BMP file to the"***LOG***" directory of the internal storage inside the Scan Engine. The intent is for capturing, and then sending (via an FTP transfer) digital images to Zonare for evaluation*

Operate the system normally until the desired ultrasound image event has occurred, at which time press "Freeze" to retain the image on the screen.

1. Go to the Diagnostic page.
2. Place the cursor over the top of the **Store Image** selection and press the "SET" button to initiate the capture of the current ultrasound image screen.
3. Place the cursor over the top of the **Store Logs** selection and press the "SET" button again, to ensure there is log file content to enable sending to the FTP site.
4. To download the log folder contents (which also contains the stored .BMP Image file) to the ZONARE Tech Support, enter the proper IP Address, User Name, and Password values in the entry boxes on the screen (values as provided by ZONARE Tech Support)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

NOTE: *The Scan Engine must be docked in the SmartCart and the Z.ONEUltra must be connected and properly configured on a local IT network that WWW internet access, in order to perform the remote system log file transfer to ZONARE.*

Using the trackball, position the arrow cursor over the **Send System Logs** box, and press the “SET” button to initiate the system log transfer

---

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

16.7.8 Remote Software Upgrade (download) from ZONARE site

NOTES: ***PRIOR*** *to beginning a remote software download/installation process, it is necessary to contact Zonare Technical Support, for assistance in setting up the necessary software files on the FTP site, for each remote software upgrade session.*

The Z.ONE*Ultra will need to be attached to an active direct internet accessible networked connection, at the install site, in order to perform this remote software upgrade procedure.*

1. Dock the Scan Engine in the SmartCart, and ensure the network port on the Rear I/O panel of the SmartCart is connected to an active internet connection.
2. Insert the USB Memory Stick to be targeted for downloading of the software installer files, into one of the USB ports on the back of the SmartCart.
3. Power on the system and allow it to fully boot.
4. Using the "***Tab***" button and ***Menu Control*** on the SmartCart user interface, advance to the "***Tools***" menu and then sequence through the following selection:

   Tools tab **--> System Setup --> Diagnostics**

5. Click on the **CHECK AVAILABLE SOFTWARE** softkey to open remote communications for determining the available software for upgrade on the remote FTP site. A message should appear on the screen, indicating the available software for download, and specifying the software revision level that is posted.
6. To begin the remote software downloading process, click on the **UPGRADE** softkey.

   NOTE: The time required for downloading the complete software installer files to the USB Memory Stick will be determined by the network speed at the facility. Typically the download time is about 10 minutes.

7. At the completion of the downloading of the software installation files to the local USB Memory Stick, the system will put up a prompt on the screen. The prompt will offer the User the option of performing installation of the new software on the scan engine.
8. In order to start the software installation process, accept the offered prompt. The software installation should begin, and will typically take less than 10 minutes to complete.

   For information on the specific steps that will occur during the software install, refer to the section on software installation elsewhere in this manual.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

17 CLEANING AND DISINFECTING PROCEDURES

17.1 SmartCart

17.1.1 Cleaning SmartCart LCD Display

CAUTION

- *Take care not to damage or scratch the glass or LCD panel.*
- *Do not apply pressure on the glass or LCD panel.*
- *Do not apply or spray liquid directly to the glass, panel or cabinet as excess liquid may cause damage to internal electronics. Instead, apply the liquid to the cleaning cloth.*
- *Do **NOT** use any of the following:*
  - *Lye or cleaning solutions containing lye**
  - *Acid*
  - *Detergents with fluoride*
  - *Detergents with ammonia*
  - *Detergents with abrasives*
  - *Steel wool*
  - *Sponge with abrasives*
  - *Cloth with thread made of steel*
  - *Other coarse tools*

- **CLEANING**

  Front Glass:

1. Power down the Z.ONE*Ultra* ultrasound system
2. Clean the glass using a soft cotton cloth, lightly moistened with a watery solution or a mild commercial glass-cleaning product suited for coated glass surfaces
3. Wipe dry with a clean, dry, soft, lint-free cloth

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

External Case:

CAUTION

- *Do **NOT** expose the external case to any of the following:*
  - *Cidex*
  - *Betadine*
  - *Alcohol (Isopropyl and Ethyl)*
  - *Ammonia based cleaners (Windex)*
  - *Aquasonic Gel*

1. Power down the Z.ONE*Ultra* ultrasound system
2. Clean the external case of the display using a soft cotton cloth, lightly moistened with a mild cleaning product recognized for safe use on medical equipment
3. Repeat with water only
4. Wipe dry with a clean, dry, soft cloth

17.1.2 Cleaning the SmartCart exterior surfaces

CAUTION

- *Do not use disinfectants (such as gluteraldahyde or hydrogen peroxide), or acetone, to clean any surfaces on the* Z.ONE*Ultra, or its accessories:*

1. Power down the Z.ONE*Ultra* ultrasound system
2. Using a soft cloth, only dampened with mild soap and water, clean the exterior surfaces.
3. Thoroughly dry all cleaned surfaces with a soft cloth

17.2 Scan Engine

17.2.1 Cleaning LCD Display

1. Power down the Z.ONE*Ultra* ultrasound system
2. Spray a mild cleaner onto a soft, clean cloth, and wipe the screen clear of dust, fingerprints, etc.
3. Thoroughly dry all cleaned surfaces with a soft cloth

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

17.3 Transducers

17.3.1 Cleaning – Care of Transducers

17.3.1.1 Approved disinfectants

CAUTION

- *The disinfecting products listed below apply to all Zonare transducers EXCEPT the **P8-3TEE** transducer. Follow manufacturer's specified instructions for that specialized transducer to prevent damage. :*

- **Immersion Solutions**

Only disinfectants listed below are tested and approved for use on the ZONARE transducers specified above. No other products should be used, as damage to the transducer may result.

- **CIDEX**
- **CIDEX PLUS**
- **CIDEX OPA**
- **T-SPRAY / T-SPRAY II**
- **METRICIDE (14-Day)**
- **OMNICIDE**
- **GIGASEPT**
- **VIRKON**
- **ANIOXYDE 1000**

Figure 57: Approved Disinfectants Table (Immersion-Method)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- **Wipe Solutions**

Only disinfectant listed below are tested and approved for use in wipe-method cleaning on the ZONARE transducers specified above. No other products should be used, as damage to the transducer may result.

- **T-SPRAY / T-SPRAY II**
- **SaniCloth Plus**
- **CaviWipes**
- **Isopropyl 50% alcohol**

Figure 58: Approved Disinfectants Table (Wipe-Method)

17.3.2 Cleaning – Disinfecting Procedures

There are two methods of cleaning and disinfection available for the Z.ONE*Ultra* transducers.

- For external-use transducers (CLA and LA), ZONARE recommends performing the "wipe method" (described next) after each exam. In addition, ZONARE recommends performing the immersion method disinfection weekly.
- For internal probe (EV), ZONARE recommends performing the "immersion method" disinfection after each exam.

The Z.ONE*Ultra* transducers cannot be sterilized. When sterility is required, use a sterile transducer cover/sheath and sterile ultrasound/coupling transducer gel. Follow all prescribed sterility techniques.

WARNING

To avoid electrical shock, prior to cleaning any transducer, fully disconnect it from the Scan Engine. If cleaning of the transducer is being performed near the Z.ONE*Ultra, ZONARE also recommends disconnecting the AC power from the SmartCart or miniCart..*

CAUTIONS

Always use protective eyewear and clothing when cleaning or disinfecting the transducers. Do not allow the disinfectant to come in contact with metal surfaces (transducer connector). Use a soft cloth and warm soapy water to remove any disinfectant that remains on metal surfaces. If using a brush, only use a very soft brush when cleaning transducers, because even a soft brush may cause transducer damage. Use only a soft cloth

17.3.2.1 Wipe Method

1. Disconnect the transducer from the Z.ONE*Ultra*.
2. Remove the transducer cover/sheath and discard.
3. Clean the surface of the transducer, using a soft cloth dampened with mild soap (or isopropyl alcohol) to remove particulate, ultrasound coupling gel, or body fluids. Apply the cleaning solution to the cloth, and then use to wipe down the transducer.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4. After cleaning, wipe the transducer again with a cloth soaked with clean water to remove solution.

Mix the disinfectant solution following the disinfectant label instructions for solution strengths and disinfectant contact duration.

5. Air dry the transducer or towel dry it with a clean cloth.
6. After disinfecting, wipe the transducer again with a cloth soaked with clean water to remove any residual solution prior to use on patients.
7. Examine the transducer for damage, such as cracks, splitting, holes, or fluid leaks. If damage is evident, discontinue use of the transducer and contact Tech Support.

17.3.2.2 Immersion Method

CAUTIONS

During immersion disinfection, never immerse the transducers longer than the maximum specified time (as per the Operator Manual instructions) of 45 minutes. Damage may occur to the transducer housing and/or components if disinfection times exceed these recommended limits.

Using a non-recommended cleaning or disinfectant solution, incorrect solution strength, or immersing the transducer deeper or longer than indicated can damage the transducer.

To prevent possible damage to the electronics of the transducer, never immerse the transducer beyond the point (10mm below the top edge of the transducer housing), as shown in the figure below.

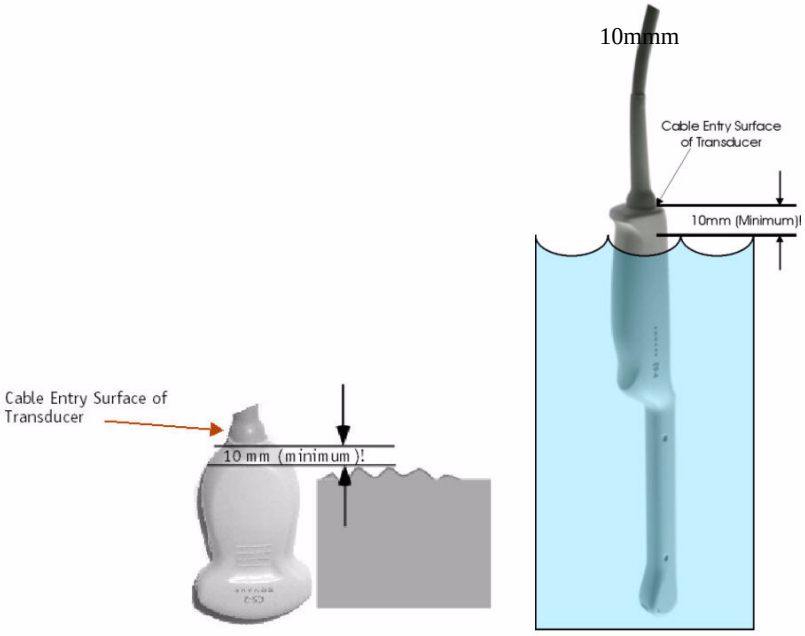


Figure 59: Transducer immersion limits

1. Disconnect the transducer from the Z.ONE*Ultra*.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

2. Remove the transducer cover/sheath and discard.
3. Clean the surface of the transducer, using a soft cloth dampened with mild soap (or isopropyl alcohol) to remove particulate, ultrasound coupling gel, or body fluids. Apply the cleaning solution to the cloth, and then use to wipe down transducer.
4. After cleaning, wipe the transducer again with a cloth soaked with clean water to remove solution.
5. Mix the disinfectant solution, following the disinfectant label instructions for solution strengths and disinfectant contact duration (Refer to Error! Reference source not found.)
6. Immerse the transducer into the disinfecting solution, ensuring it is not immersed below the depth indicated in the figure (Refer to **Figure 59: Transducer immersion limits**)
7. Follow the instructions on the disinfectant label for the duration of transducer immersion; do NOT exceed the 1 hour maximum ZONARE-specified limit.
8. Following the instructions on the disinfectant label, thoroughly rinse all areas of the transducer below the immersion level.
9. Air dry, or towel dry, the transducer with a clean cloth.
10. Examine the transducer for damage, such as cracks, splitting, holes, or fluid leaks. If damage is evident, discontinue use of the transducer and contact Tech Support.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

18 MAINTENANCE – CALIBRATION PROCEDURES

18.1 Foreword

Being a digital front-end imaging system, and non-mechanical device, the Z.ONE*Ultra* has a very limited number of routine maintenance and calibration procedures that will be required. The maintenance procedures currently described in this manual, are very basic in nature, and may therefore be performed by the Operator, as well as normal Service personnel.

18.2 List: Maintenance Procedures

The basic maintenance procedures to be performed on the Z.ONE*Ultra*, consists of the following:

- Adjustment of UI Lift Release, cable adjustment
- Cleaning of accumulated dust from air inlet screens on Scan Engine
- General wipe-down cleaning of all User contact surfaces

18.3 List: Calibration Procedures

The basic maintenance procedures to be performed on the Z.ONE*Ultra*, consists of the following:

- Calibration of the Touchscreen function on the Scan Engine

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

18.4 PIC Reset (Power Supply) Procedure

After installing a new battery pack, before performing the ***Recondition*** process, it is necessary to reset the power controller logic (PIC) inside the Cart power supply to a known set of states. The following "PIC RESET" process will achieve that goal.

STEPS:

1. Ensure the system is initially powered OFF
2. Undock the scan engine/module from the deck of the SmartCart
3. With no Scan Engine/Module installed, press-and-hold (for about 10 seconds) the cart front panel On/Off power button until the Cart fan turns on.

   This will reset the power controller (PIC) on the Cart power supply and properly initialize the battery management functions. LED #2 on the rear of the Cart should blink indicating the battery is charging.
4. Temporarily place AC circuit breaker in the OFF ("0") position.
5. Return the AC circuit breaker back to the ON ("1") position

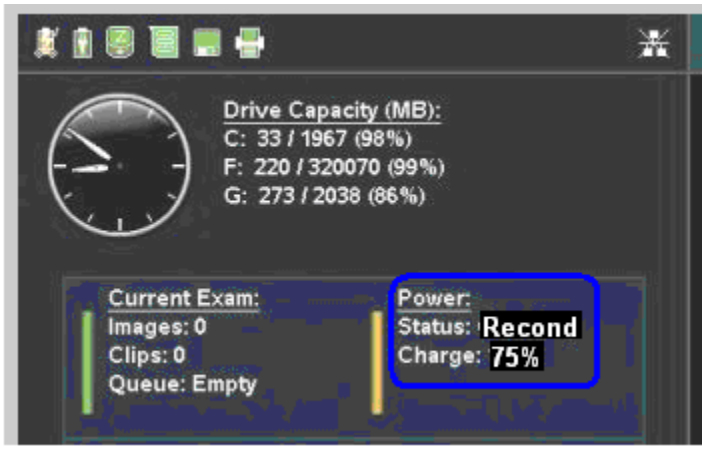
18.5 Z-PAK "RECONDITION" Procedure - (SmartCart)

STEPS:

1. Ensure the AC circuit breaker, at the rear of the SmartCart, is in the On ("1" pressed IN) position.
2. Fully boot up the system and then press the "**SERVICE**" key (third key from top-right) on the SmartCart, to bring up the DIAGNOSTIC page.
3. Select the "**MAINTENANCE**" option at the bottom of the screen.
4. Select the "**RECONDITION BATTERY**" option on the screen, to start the Z-PAK Battery Pack recondition process.

   The ICON for the Z-PAK (in the upper-left corner of the display monitor on the Cart) should have the hospital "RED CROSS", and the on screen power status indication should show a state of "RECOND" with the percentage of charge level during he recondition provided. As shown below:

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



5. Leave the system attached to AC Power, with a posted note on the monitor to warn other users to not disturb the process until completed.

NOTE

The "Recondition" process consists of two phases (as listed below). The percentage of completion of those two phases can be monitor in the "Charge: xx%" messaging shown on the display. The percentage will increment up to 100% during the charge-up phase, and then decrement to 0% during the discharge phase.

- "Charge up to full"

- "Discharge slowly to empty"

6. An INFORMATION message of " ***Reconditioning of the Smartcart Battery is Complete***" will appear on the screen, and the red cross ICON will be removed, at the conclusion of the recondition process.

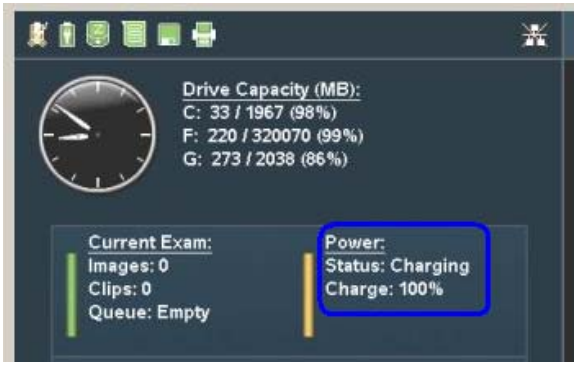
NOTE: The Z-PAK is at a fully **DISCHARGED** state at this moment where the battery fuel gauge recalibration phase is completed. The system must be left attached to AC power for additional time (3-4 hours) to allow the final recharging time for the Z-PAK to complete, prior to attempted battery-based Cart use.

- **FINAL RECHARGE PHASE**

7. At the conclusion of the "Recondition" process, the Z-PAK ICON should appear as shown below (indicating a final *recharging* state is in progress), and remain on the screen during the entire recharging interval (usually about 3-4 hours).

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

8. Completion of the recharge process can be identified by the Z-PAK ICON changing to a green color with the AC power plug icon inside, and the charge level display on the monitor as 100% (as shown below).



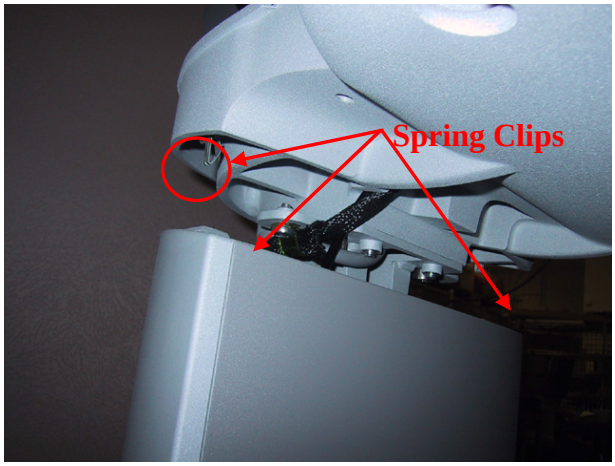
9. At this time the recharging process is complete, the Z-PAK batttery is at a full **100% charge state**, and the system is ready for battery-based standalone Cart use.

18.6 UI Lift (Gas spring) Release Cable Adjustment - (SmartCart)

18.6.1 Gaining access to cable adjuster

STEPS:

10. Ensure the Z.ONE*Ultra* is powered "OFF".
1. Place AC circuit breaker, located at the rear of the SmartCart, in the "OFF" position.
2. Disconnect the main AC power cord from the rear of the SmartCart or unplug from the wall source.
3. Using the side of the hand – firmly knock the side of the chassis cosmetic sleeve loose. There are 3 spring clips that retain it at the top. If it does not come free – gently use the flat blade screwdriver to pry the cosmetics loose (use tape on the blade to avoid marring the chassis surface).



"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

18.6.2 Cable adjustment (Barrel adjuster)

1. While holding tension off the cable adjuster, rotate the silver barrel adjuster in the direction required for correcting the current type of release issue (see notes below).

NOTE 1: If the cable has **too much** slack (the lift is not adequately releasing), rotate the adjuster barrel in the ***counter-clockwise*** (as viewed from the top) direction, a sufficient amount to reduce cable slack, and provide an optimum release point on the release lever handle.

NOTE 2: If the cable is **too tight** (the lift is not staying locked in position when the release lever handle is fully released – aka "drifting"), rotate the adjuster barrel in the ***clockwise*** (opposite to what is shown in the illustration above) direction just far enough to resolve the "drifting" condition.

2. Reverse cable access process above, to complete this procedure

---

18.7 Touchscreen Calibration - (Scan Engine)

IMPORTANT

⚠

The touchscreen is very sensitive to the "technique" used by the Operator in making contact at each of the calibration points with the stylus. It is very important that only a single discrete (and firm) contact be made at each of the green splash graphics calibration points. Any excessive debounce, when pressing the stylus to the screen, will likely result in a failure of the calibration process.

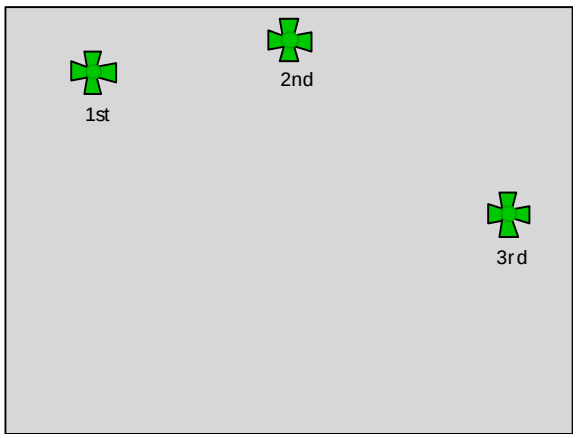
18.7.1 Calibration Procedure

1. Remove the Scan Engine from the SmartCart
2. Press the On/Off switch on the Scan Engine, to power-on the Z.ONE*Ultra*
3. Using the "***Tab***" button and ***Menu Control*** on the Scan Engine user interface, advance to the "***Tools***" menu and then sequence through the following selection:

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Tools tab --> **SYSTEM SETUP --> Touchscreen**

4. Press the "SELECT" button on the user interface. The Touchscreen calibration screen should appear, with the first (of 3) green "splash" target points being should now be displayed



2. In a **single-firm contact motion**, touch (and hold) the stylus to the center of the 1st target point until the Z.ONE*Ultra* detects this contact, and moves the calibration target point graphic to the next (2nd) calibration position.
3. Repeat the same single-firm touch (and hold) procedure for the remaining two calibration points.
4. If successful, the Z.ONE*Ultra* should return to the *System Setup* menu. If calibration failed message appears, repeat the process being very attentive to the method of (single point) stylus contact with the LCD display for contact.

18.7.2 Verifying Calibration

1. Using the ***Menu Control,*** advance to the "***Annotations***" selection.
5. Press the "SELECT" button to bring up the Annotations screen.
6. Press the "SELECT" button to bring up the **VKB** (Virtual "Keyboard").

7. Using the trackball, position the arrow cursor in the "New Item" entry box on the screen and press the "SET" key.
8. Using the stylus to touch within the virtual keys on the **VKB**, verify that the desired text characters appear in the text entry box on the screen.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

18.8 Display Monitor Adjustment – User Settings

18.8.1 *mini*Cart or SmartCart Display User Settings Adjustment

There are no local adjustment knobs on the LCD Display used on the *mini*Cart or SmartCart. The display settings of the monitor are controlled remotely (via the DVI video cable connection), by an on-screen Audio/Video control menu on the system.

To access the Audio/Video setup menu, use the "***Tab***" button and ***Menu Control*** on the user interface, advance to the "***Tools***" menu and then sequence through the following selection:

Tools tab --> **SYSTEM SETUP --> DISPLAY --> AUDIO/VIDEO**

The adjustable settings are:

- Brightness
- Contrast
- Color Temperature (Red, Green, Blue)

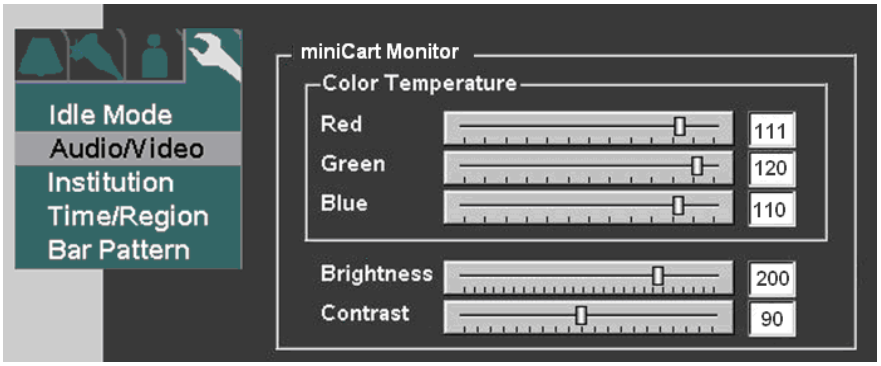


Figure 60: *mini*Cart 13" Display: Recommended Settings -

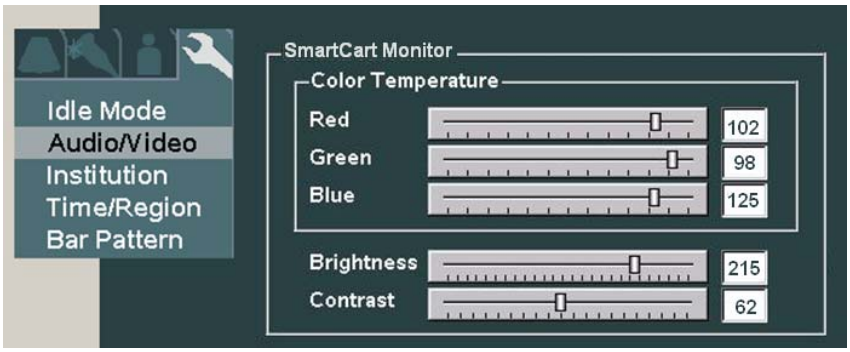


Figure 61: SmartCart 19" Display: Recommended Settings

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

The adjustment of the video settings on the LCD Display, are accomplished by performing the following steps.

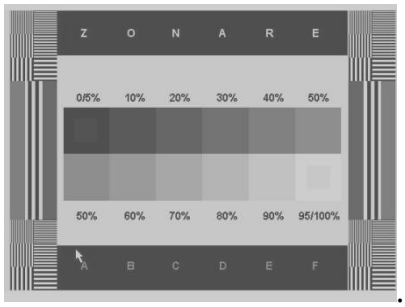
1. Power on the Z.ONE*Ultra* and allow it to fully boot
2. Using the onscreen menus of the Scan Engine, select **Tools** | **System Setup** | **Display** | **Audio/Video**|, to access the audio/video configuration menu
3. Using the trackball, place the cursor arrow to the desired position on the sliding bar scale (of the desired display control), and press the **SET** key to mark the setting.
4. Repeat the steps above for any additional display settings that are desired for change.
5. To save the new settings and exit, select **Apply** from the menu, to save the configuration and return to the Audio/Video menu.
6. Visually inspect the output of the LCD Display, to confirm the desired video levels are achieved. Repeat the above steps, if required

---

Grayscale Test Pattern:

1. Using the "***Tab***" button and ***Menu Control*** on the user interface, advance to the "***Tools***" menu
2. Sequence through the following selections to bring a grayscale test pattern (called "***Bar Pattern***" in the menu) onto the SmartCart display.

TOOLS tab **--> SYSTEM SETUP --> DISPLAY --> BAR PATTERN**



3. To remove the bar pattern from the display; push the "***BACK***" button on the user interface.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

19 SYSTEM TROUBLESHOOTING

19.1 Foreword

Many Z.ONE*Ultra* malfunctions are caused by a routine problem, such as power disconnection or the maladjustment of basic imaging or peripheral device (LCD display) controls. Before calling Tech Support, please perform the following troubleshooting procedures on the affected component(s).

The troubleshooting information in this section is intended to assist in diagnosing potential causes of a variety of system problems. It should be noted that as a result of the advanced level of integration in the electronic circuitry of the Z.ONE*Ultra* diagnostic ultrasound system, the amount service/repair that can be performed in the field, is limited to a specific number of FRU's (Field Replaceable Units).

19.2 Technical Support Contact Information

- **USA, Canada and Asia**

ZONARE Medical Systems Inc
420 N. Bernardo Avenue
Mountain View, CA 94043

Toll-free live-phone support: ..... **1-877-913-9663** (5:00AM – 5:00PM, Pacific Standard Time)

Tech Support FAX line **1-650-230-2817**

Tech Support e-mail ..... **techsupport@zonare.com**

Corporate web site..... **www.zonare.com**

FTP site (Tech Support Window):

- URL **ftp://12.40.200.87**
- Enter the following User Name and Password information:

User Name: (call Tech Support for current login information)

Password: (call Tech Support for current login information)

- **Europe**

ZONARE Medical Systems GmbH
Henkestrasse 91
91052 Erlangen, Germany

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Tech Support Phone ..... **(+49) 9131-974 94-0** (8:00AM – 5:00PM)

Tech Support e-mail ..... **info@zonare.de**

Corporate web site..... **www.zonare.com**

FTP site (Tech Support Window):

- URL **ftp://12.40.200.87**
- Enter the following User Name and Password information:

User Name: (call Tech Support for current login information)

Password: (call Tech Support for current login information)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

19.3 Troubleshooting

19.3.1 Transducer Problems

CAUTIONS

Bent, broken, or missing pins on the transducer connector may cause poor image quality, including possible mirror image artifact. Be sure to check pins before connecting transducer to the ZONARE ultrasound system. If pins are bent, broken, or missing, do not use the transducer and call ZONARE Technical Support.

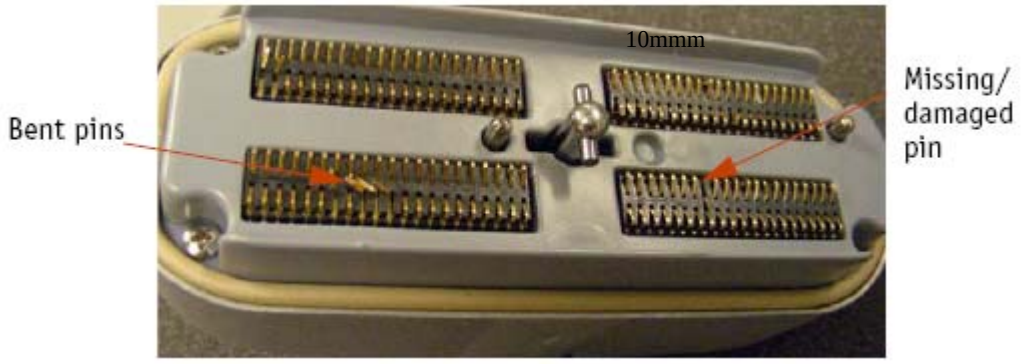


Figure 62: Transducer Connector Pin Damage – (Example)

Inspection of Transducers

1. Routinely inspect transducers for the following problems.
    - Signs of wear or damage to the housing, cable, etc.
    - Cracks in case or transducer face
    - Cuts or gouges on any part of the transducer, including transducer face, case, cable, and connector
    - Buckling or bulging of the lens material on the transducer face
    - Damage to the transducer connector, including bent, broken, deformed, or missing pins
2. Immediately replace a transducer that exhibits any of the above damage symptoms

19.3.2 Power-On Problems

SmartCart (with docked Scan Engine) fails to power on

1. Ensure that the AC power is connected to a wall outlet.
2. Ensure that the circuit breaker (located in the lower-left of the rear panel) is pressed down in the "**1**" (On) position.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

3. Ensure that the "**PIC**" alive status LED (left-most/#1 LED, as viewed from the rear), at the back of the SmartCart, is flashing.

4. After docking Scan Engine, ensure that the "PIC" alive status LED begins flashing quickly, and "**VSCANNER**" power LED (right-most/#6, as viewed from the rear), is solid green.

5. If the status LEDs do not match this status, remove the Scan Engine from the scanner deck on the SmartCart and inspect for any damage to Scan Engine and SmartCart docking connectors; check for any debris/obstructions in docking area or on connectors.

6. Re-dock the Scan Engine on the SmartCart, ensuring proper alignment, and then repeat checking procedure.

7. Press the Power On/Off button (on the Scan Engine Scanner Deck of the SmartCart). Ensure that the "**VMAIN**" power LED (2nd from right) at the back of the SmartCart, is solid green.

8. If the SmartCart still does not power on, remove the Scan Engine and attempt to operate it in the stand-alone mode to determine if the problem is with the SmartCart or the Scan Engine.

9. If either component fails to start up after these steps, contact ZONARE Tech Support.

SmartCart – System Power-Up Sequence

1. Turn off system (circuit breaker off or unplug), remove Scanner from SmartCart

   NON Z-PAK (Cart battery pack) equipped systems:

   - No LEDs on system status panel at rear of SmartCart should be lit

   Z-PAK (Cart battery pack) equipped systems:

   - LED #1 should be flashing on system status panel at rear of SmartCart

2. Connect AC power to SmartCart and turn ON (1) circuit breaker

   - LED #1 (PIC status) should be blinking. If blinking (Should be slow since system turned off), indicates PIC on the Power Supply Module is up and running and probably has valid firmware

   - If not blinking, PIC is either not getting power (AC wall, circuit breaker, AC-DC switcher) or PIC is in BootLoad mode

3. Testing for Power Supply Module being in BootLoad mode:

   - Undock the scanner from the SmartCart

   - Press Power On/Off button on the SmartCart

   - If UI lights kick on and green light inside On/Off button starts slow blinking, PIC on Power Supply Module is probably in BootLoad mode

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

NOTE: BootLoad mode results in inability for system to check for scanner docking present, and does not illuminate any of the five system status LEDs on the rear panel of the SmartCart

- Turn off the SmartCart with another push of the On/Off button

5. Correcting Power Supply Module out of BootLoad mode:

- Dock the scanner on the SmartCart
- Manually press the power button directly on the scanner, to turn its power on
- Press Power On/Off button on scanner Scanner Deck, to turn the SmartCart on
- Go to the System Setup->Diagnostic page, and perform the “Upgrade PIC” operation

SmartCart – System Power-Up Testing & PIC “Reset”

1. Testing On/Off power button operation, and forcing a “PIC Reset” on Power Supply Module:

- Undock the scanner from the SmartCart
- Press, and hold (for approx. 10 seconds) the Power On/Off button on SmartCart
- LED #1 should blink rapidly and LED #2 should blink at a slower rate, to indicate the PIC is “Resetting”

1) IF LED #1 does not blink rapidly, a problem with the Power On/Off button or cabling is indicated

SmartCart – Verifying Basic Power Supply Functionality

– Verifying for VSCANNER power supply output:

1. Eject the battery pack from the Scan Engine, and dock scan engine on SmartCart
2. All four of the battery charge LEDs on the Scan Engine should illuminate for approx 5 seconds, and then go out.
3. LED #5 (VSCANNER) on back of SmartCart should be illuminated

---

– If LED #5 does **NOT** turn on, problem is likely w/Scanner detect circuit or power supply

1. Press the Power On/Off button on SmartCart to check response. If Scan Engine is not detected, VMAIN (LED #4) won't illuminate. If VMAIN (LED #4) does turn on, VSCANNER voltage is defective.

– If LED #5 **DOES** turn on:

1. Press Scanner's (not Cart's) Power “On/Off button. Scan Engine (with internal battery still removed) should boot up, verifying that VSCANNER supply is OK.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Scan Engine (undocked) fails to power on

- Remove the battery from the Scan Engine, and then press the battery charge status button to ensure that a charge of greater than 25% is available. If the battery charge is insufficient, replace the battery or dock the Scan Engine in a powered-on SmartCart and allow time to recharge the battery.
- Disconnect the transducer from the Scan Engine (if attached), and then repeat the attempt at powering on the unit.
- Dock the Scan Engine in the SmartCart and attempt to power on the system. If the system powers on, the problem is likely the Scan Engine battery. Replace the battery.
- If the Scan Engine still fails to power on, contact ZONARE Tech Support.

19.3.3 System Start-Up Problems

Scan Engine (undocked) fails to properly boot

- Install a bootable (system software files present) USB Memory Stick into the USB port at the rear of the Scan Engine, and then try to power on the Z.ONE*Ultra* again (selecting the "boot from USB Memory Stick option)
- If the system boots OK, perform software re-install procedure on the Scan Engine, from the source USB Memory Stick
- If the Scan Engine still fails to power on, contact ZONARE Tech Support.

19.3.4 Peripheral Problems

19" Display monitor on SmartCart, no video

- Power down the Scan Engine, then switch off circuit breaker (at rear of SmartCart) to remove power to SmartCart electronics. Reverse process to power back on to reinitialize handshaking between the Cart and Scan Engine, and see if display becomes active.
- Remove cover on back of monitor, and inspect/verify the cable connection.
- Open up the CEE bay (under the Scan Engine Scanner Deck), to access the Cart Main Board, and check the power and video cables for proper connection.

External printer/recorder peripheral(s) fails to power on

- Check the AC power cord connections.
- Temporarily connect the AC power cord of the peripheral to a local AC receptacle, and test for operation of the peripheral.
- If the peripheral fails to power on after these steps, contact ZONARE Tech Support.

Local printer fails to print

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- Check that the printer has paper available.
- Verify power button on printer has been activated.
- Ensure that the USB cable is properly connected on the peripheral device, and connected internally to the USB port on the Main Board in the SmartCart.
- Ensure the AC power cable is securely connected at the rear of the printer.
- If the printer fails to print after these steps, contact ZONARE Tech Support.

19.3.5 Transducer Problems

Transducer not recognized by system (no B-mode imaging)

- To ensure a positive connection, disconnect the transducer and reconnect it.
- To determine a problem with the transducer or system, attach a different transducer to the Scan Engine.
- Disconnect the transducer. Power down the Scan Engine. Power the Scan Engine back on, and reinsert the transducer to test for functionality.
- Remove the Scan Engine from the SmartCart, and repeat the transducer removal/installation process.
- If system still fails to operate any transducers, contact ZONARE Tech Support.

19.3.6 Battery Charging Problems

Battery does not charge in Scan Engine, when docked in SmartCart

- Ensure AC power is present at SmartCart
- Ensure circuit breaker at the rear of the SmartCart is in the up (“ON”) position
- Verify DC voltages are present, by checking illumination of top 3 green LEDs at right/rear of Main/IO board (at rear of SmartCart).
- Battery discharge level may be too low (0%), to power internal battery intelligent electronics. Perform the following sequence to achieve sufficient trickle charging to return battery to workable state:
    - Undock Scan Engine from SmartCart, then re-dock again, leaving it for 30 seconds
    - Repeat this above dock/un-dock process (and delay), 3 more times
    - After third cycle, leave Scan Engine docked for 5 minutes to begin charging.
    - After 5 minutes, un-dock Scan Engine and remove battery to check charge state to verify charging process is now operational. If charging, re-dock Scan Engine and allow

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

1 hour for fully charging of the battery. If not, repeat previous dock/un-docking cycle sequence.

19.3.7 Imaging Problems

No/poor B-mode image

- Ensure that the brightness and/or contrast settings of the LCD display are set close to factory default levels on the SmartCart. Default settings are indicated by the asterisk (*) in the pop-up menu.
- To ensure the quality of the grayscale resolution of the LCD display, use the grayscale test pattern (via the Diagnostic menu) that is available on the SmartCart. Ensure that all shades can be visualized, making small adjustments to brightness and contrast from factory defaults, as required, to see all intensities.
- Adjust the B-mode **gain** control.
- In the on-screen menu, adjust the **A Output** (acoustic power) level.
- In the on-screen menu, under the **Preset** tab, select one of the factory default settings (General, etc.) to determine possible maladjustment of user presets.
- Ensure an adequate supply of acoustic coupling gel and good patient/ transducer contact.
- Switch to a different transducer to determine the problem.

No/poor Color Mode image or PW Doppler

- Ensure that the brightness and/or contrast settings of the LCD display are set close to factory default levels on the SmartCart. Default settings are indicated by the asterisk (*) in the pop-up menu.
- To ensure the quality of the grayscale resolution of the LCD display, use the grayscale test pattern (via the Diagnostic menu) that is available on the SmartCart. Ensure that all shades can be visualized, making small adjustments to brightness and contrast from factory defaults, as required, to see all intensities.
- Make adjustments to the various Doppler controls (**gain, filter, scale)** to attempt to resolve problem.
- Ensure that the scanning angle between the transducer face and the direction of blood flow is optimized.
- In the on-screen menu, under the **Preset** tab, select one of the factory default settings (General, etc.) to determine possible maladjustment of user presets.
- Ensure that there is an adequate supply of acoustic coupling gel and good patient/transducer contact.
- Switch to a different transducer to determine the problem.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

19.3.8 General Operation Problems

Function (F1-F4) key(s) do not operate

- Using the on-screen menu, follow the path: **TOOLS** | **SYSTEM SETUP** | **FUNCTION KEYS**) to access the menu for the user configuration of the assignments of the function keys.
- The function keys (F-keys) on the SmartCart (F1-F4) must be configured independently from the function keys on the standalone Scan Engine (F1-F2)

Unable to modify existing User Preset (shown as *grayed out* on screen)

- Ensure that the desired user preset has been previously (prior to attempting to modify it) selected as the active preset.

19.3.9 DICOM Connectivity/Communications Problems

Z.ONE will not communicate with target DICOM" Store" or "Print" device

- Check Networking ICON on upper/left corner of main imaging screen, to verify hardware connection is active (no "**X**" over ICON). Check hardware cabling, network equipment, and/or configuration, as necessary.
- Power cycle (AC circuit breaker) the SmartCart, and the Scan Engine, then retest for connectivity/transfer functionality.
- Press the **DICOM Queue** key, and inspect for any pending jobs in the Queue. If any jobs pending, delete them and then power cycle the Scan Engine and Cart, and then re-test network state.
- In "**General**" and "**Network**" configuration pages, verify DICOM Application Title, and IP address/gateway/netmask parameters are entered correctly, and correspond with those assigned to Z.ONE*Ultra* ultrasound system by the IT Admin at the install site.
- In the DICOM" "**Network Store**" and "**Printer**" configuration pages, verify AE Title, IP Address, and Port Number parameters are entered correctly, and match those assigned to the corresponding device by the IT Admin for facility, at install site.
- Using the "PING" and "VERIFY" selection in the DICOM configuration menus, for the Network Storage or Printer Administration screens (as applicable to device attempting to be connected), test for successful handshaking of connection.
- Using another device (PC, etc.) on same domain on hospital network, perform a "PING" operation to the IP address assigned for the Z.ONE*Ultra*, in the "Network" configuration page, to test for TCP/IP connectivity.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

19.4 System Status LED & Error Code Definitions

19.4.1 SmartCart

19.4.1.1 On-Screen “Dashboard” System Status ICONs

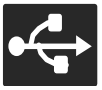
NOTE: If the SmartCart is equipped with the on-board battery option, two (2) battery icons will displayed on the upper-lefthand corner of the LCD display of the SmartCart. If there are two battery icons, the icon on the **LEFT** represents the **SmartCart** main battery and the icon on the **RIGHT** represents the **Scan Engine** battery (if present).

Icon	Function	Status Description
	Battery: SmartCart (Left) Scanner: (Right)	System running on AC Power, and Battery is **fully charged**.
	Battery: SmartCart (Left) Scanner: (Right)	System running on AC Power, and Battery is currently **charging**.
	Battery: SmartCart (Left) Scanner: (Right)	Battery is currently undergoing a **“Reconditioning”** process (approx 12 hours)
	Battery: SmartCart (Left) Scanner: (Right)	Battery status is currently unknown
	Battery: SmartCart (Left) Scanner: (Right)	System running on Battery source power (**more** than **25%** remaining charge)
	Battery: SmartCart (Left) Scanner: (Right)	System running on Battery source power (**10%-25%** remaining charge)
	Battery: SmartCart (Left) Scanner: (Right)	System running on Battery source power (**less** than **10%** remaining charge)
	Scan Engine Internal Media	Scan Engine internal media is not available for storage
	Scan Engine Internal Media	Scan Engine internal media is initializing, in preparation for storage
	Scan Engine Internal Media	Image storage is occurring to the Scan Engine internal media

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

	Scan Engine Internal Media	>20% of Scan Engine internal media storage capacity remaining
	Scan Engine Internal Media	5-20% of Scan Engine internal media storage capacity remaining
	Scan Engine Internal Media	<5% of Scan Engine internal media storage capacity remaining
	SmartCart Hard Drive Media	SmartCart hard drive is initializing for image storage
	SmartCart Hard Drive Media	SmartCart hard drive is storing images
	SmartCart Hard Drive Media	>20% of SmartCart hard drive storage capacity remaining
	SmartCart Hard Drive Media	>5% - <20% of SmartCart hard drive storage capacity remaining
	SmartCart Hard Drive Media	<5% of SmartCart hard drive storage capacity remaining
	SmartCart DVD Media	SmartCart DVD media inserted, but not available for image storage
	SmartCart DVD Media	SmartCart DVD media inserted and is available for image storage
	SmartCart DVD Media	Image storage to SmartCart DVD media is occurring
	SmartCart DVD Media	SmartCart DVD is inserted but is FULL
	Scan Engine or Cart Removable Media (USB)	Removable storage media (USB) is being initialized
	Scan Engine or Cart Removable Media (USB)	Storage operation is actively in-process to removable storage media (USB)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

	Scan Engine or Cart Removable Media (USB)	>20% of capacity of removable storage media (USB) still remains
	Scan Engine or Cart Removable Media (USB)	5-20% of capacity of removable storage media (USB) still remains
	Scan Engine or Cart Removable Media (USB)	<5% of capacity of removable storage media (USB) still remains
	USB Local Printer	Local USB printer is connected/active
	USB Local Printer	Local USB printer has a printing job in progress
	USB Local Printer	Local USB printer has an error condition (job will not print)
	USB Generic Device	Generic USB device attached to system (e.g. barcode reader, etc.)
	Network	Network connected and active
	Network	Network *disconnected*
	Network	Network transfer has an *error* (Re-Queuing of job, etc) preventing transfer
	Wireless Network	Wireless network connected and active
	Wireless Network	Wireless Network *disconnected*
	Wireless Network	Wireless Network transfer has an *error* (Re-Queuing of job, etc) preventing transfer
	Wireless Network	Wireless signal strength: 1% – 20%

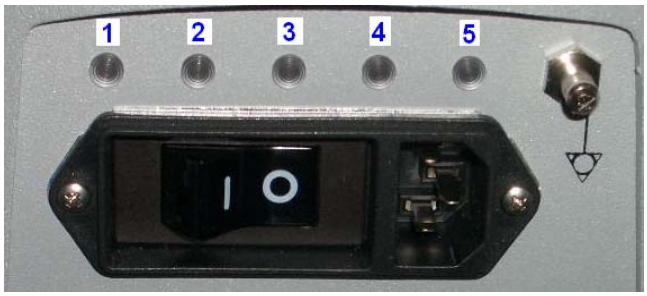
"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

	Wireless Network	Wireless Network Wireless signal strength: 21% – 40%
	Wireless Network	Wireless Network Wireless signal strength: 41% – 60%
	Wireless Network	Wireless Network Wireless signal strength: 61% – 80%
	Wireless Network	Wireless Network Wireless signal strength: 81% –100%

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

19.4.1.2 Rear I/O Panel – System Status Lamps

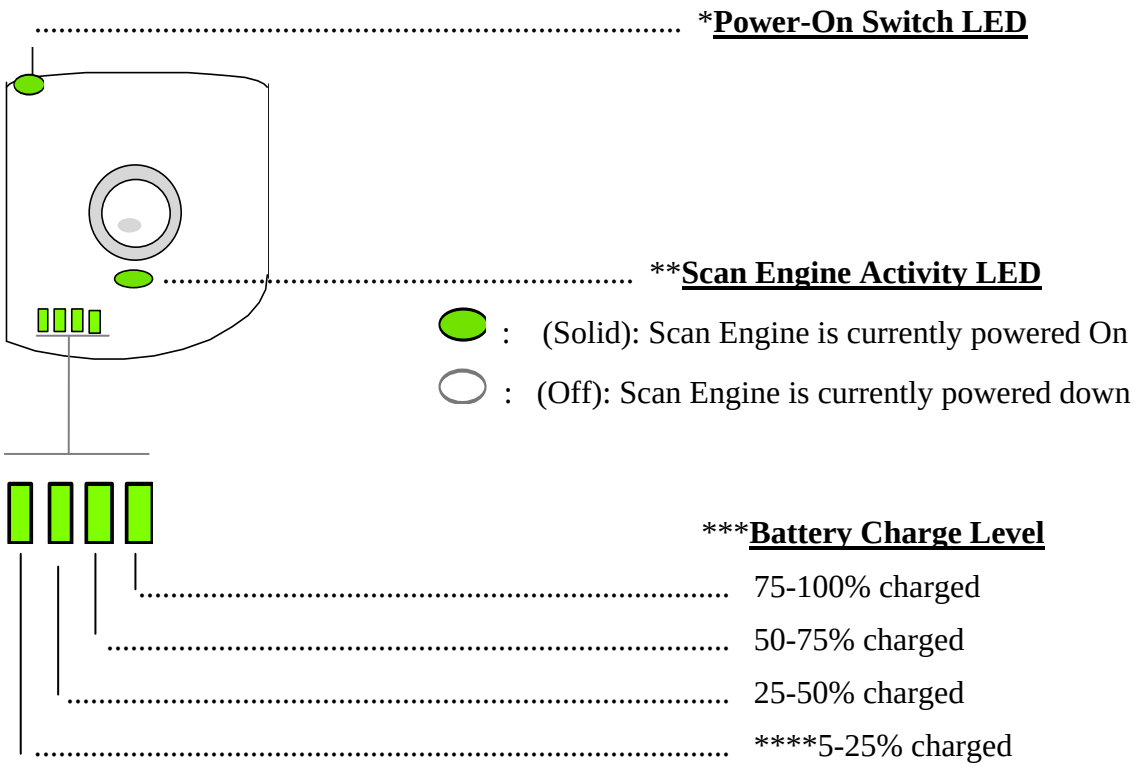
The five (5) system status indicator lamps located on rear of the SmartCart (panel just above the main AC circuit breaker) can be used to assist in troubleshooting problems with the system. The definition of the each lamp is as shown in the table below:



LED #	LED	STATUS	Definition
1		"PIC"	**Slow Blinking**: System in "Standby" mode (Scan Engine NOT docked)
			Fast Blinking: Scan Engine ***docked*** (Scan Engine powered "ON" or "OFF")
2		"Battery"	**OFF**: No battery installed, or completely depleted
			Blinking: Battery charging (or reconditioning) in-process
			Solid: Battery is fully charged
3		"VAux"	**Currently not active:** - LED is currently always "**OFF**"
4		"VMain"	**Solid**: +12V VMain power - Power On/Off button pressed or Scan Engine and System fully "ON"
			OFF: Power On/Off button not yet pressed
5		"VScanner"	**Solid**: +12V VScanner power - Scan Engine ***docked*** (Scan Engine powered "ON" or "OFF")
			OFF: Scan Engine ***un-docked***

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

19.4.2 Scan Engine



*****BATTERY CHARGE LEDS - BASIC NOTES:**

Note 1:

Battery charge level LEDs are ONLY illuminated momentarily (approximately 5 seconds) and then go out, when one of the following conditions occurs:

1. The battery pack is initially inserted into the Scan Engine
2. The Scan Engine is initially powered-on

Note 2:

The Scan Engine will alert the User (message on LCD display and flashing charge level LED), and automatically begin a controlled shutdown sequence, when the battery charge level diminishes to 5%. All current settings will be saved to flash memory, prior to the automatic shutdown sequence.

******BATTERY CHARGE LEDS - SPECIAL NOTE:**

When battery voltage is depleted down to the levels listed below, the battery power status indicator, displayed on the LCD Monitor of the Scan Engine, will do the following:

1. <10%: Status display will be **AMBER** and “flash”

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

2. =5%: Status display will turn **RED**, an impending shutdown warning message will be displayed on the Monitor, and after 1 minute, the system will begin a shutdown sequence.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

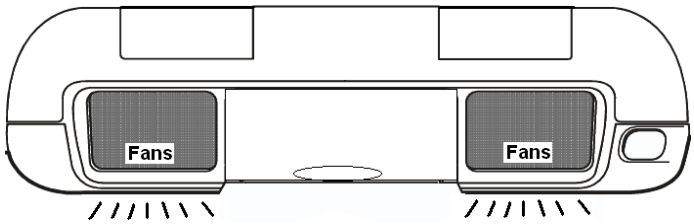
19.4.3 System Error Message Codes

Error Code	Subsystem	Message for Error Log	User Error Message	Action On Error
0xa0060402	I2C	ThermalControl Sensor Error	"Thermal Sensor Error: Please shutdown system."	STOP
0xa0060403	I2C	System Overhead Warning	"System Overheat Warning: Finish exam and shutdown."	CONTINUE
0xa0060405	I2C	Battery Overheat Warning	"Battery Overheat Warning: finish exam replace battery"	CONTINUE
0xe0004005	n/a	Fatal Error due to NVASSERT	"Internal System Error has occurred"	RESTART
0xe0060401	I2C	Fan is stuck.	"System fan Error: Please shutdown system."	SHUTDOWN
0xe0060404	I2C	Exceeded maximum system error count.	"System Temperature Limit exceeded."	SHUTDOWN
0xe0060406	I2C	Battery temperature error	"Battery Temperature Limit Exceeded. Replace battery."	SHUTDOWN
0xe0080001	Display	DVI configuration failed	"Internal System Error has occurred"	SHUTDOWN
0xe0090401	FE Power	Low Voltage failure occurred.	"Internal System Error has occurred"	SHUTDOWN
0xe00a0401	HV	PIC is Invalid, No HV support);	"Internal System Error has occurred"	RESTART
0xe00a0403	HV	Invalid the power up parameters);	"Internal System Error has occurred"	RESTART
0xe00a0404	HV	Failed to reset the PIC HV task);	"Internal System Error has occurred"	RESTART
0xe00a0405	HV	Failed to set HV limits to PIC)	"Internal System Error has occurred"	RESTART
0xe00a0406	HV	Failed to set QDAC voltage to target);	"Internal System Error has occurred"	RESTART
0xe00a0407	*HV*	*Obsolete - See more granual messages*	*n/a*	*n/a*
0xe00a0408	HV	Can't Read voltage from PIC);	"Internal System Error has occurred"	RESTART
0xe00a0409	HV	HighVoltage not dumped prior to power up);	"Internal System Error has occurred"	RESTART
0xe00a040a	HV	VBoost error);	"Internal System Error has occurred"	RESTART
0xe00a040b	HV	PFE HW Fault Error);	"Internal System Error has occurred"	RESTART
0xe00a040c	HV	PIC version is invalid, No HV support);	"Internal System Error has occurred"	RESTART
0xe00a040e	HV	Power Errors (Over Limit)	"Internal System Error has occurred"	RESTART
0xe00a040f	HV	HV Under Voltage	"Internal System Error has occurred"	RESTART
0xe00a0410	HV	HV Over Voltage	"Internal System Error has occurred"	RESTART
0xe00a0411	HV	HV Imbalance	"Internal System Error has occurred"	RESTART
0xe00a0412	HV	HV Power-Up Failed	"Internal System Error has occurred"	RESTART
0xe00a0413	HV	HV Unknown State	"Internal System Error has occurred"	RESTART

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Error Code	Subsystem	Message for Error Log	User Error Message	Action On Error
0xe00a0414	HV	HV's Crossed	"Internal System Error has occurred"	RESTART
0xe00a0415	HV	High Voltage	"Internal System Error has occurred"	RESTART
0xe00d0000	Imaging	Pipeline Fault Event Occured.	"Internal System Error has occurred"	RESTART
0xe0100401	Router	Video Memory Test Failed	"Internal System Error has occurred"	SHUTDOWN
0xe0100402	Router	DCM LOCK Fault has occurred);	"Internal System Error has occurred"	RESTART
0xe0110401	AcquisCntrl	Post Power on check indicates faulty power circuit	"Internal System Error has occurred"	RESTART
0xe0110402	AcquisCntrl	Failed to complete programming sequence	"Internal System Error has occurred"	RESTART
0xe0110403	AcquisCntrl	Failed to complete programming sequence	"Internal System Error has occurred"	RESTART

19.5 Scan Engine Fan Operation



The operating speeds of the two (2) fans on the Scan Engine are variable; driven by the dynamic changes in cooling requirements within the Scan Engine. Four (4) dedicated thermal sensor devices, strategically located at various locations inside the Scan Engine, provide constant temperature status information to the Processor (PIC device).

In the case where a temperature sensor error condition occurs, both fans will be set to run at MAXIMUM speed by the Processor.

19.6 SmartCart LCD Display Troubleshooting

19.6.1 Image display quality problems

Symptom	Solution
Images look too bright or saturated	Check the ***BRIGHTNESS***, ***CONTRAST*** and ***LUMINANCE*** settings, using SmartCart display's pop-up menu. Verify they are set at (or close to) the factory default setting (indicated by an asterisk * in the menu)
Completely blank display	Check cable connection at back of LCD display

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

19.7 Battery Performance – Charge Times - Reconditioning

19.7.1 Foreword:

The following information is intended to provide an overview on the battery-driven system operation times and charging intervals for the Z-PAK battery pack in the SmartCart, and the removable battery pack used inside the Scan Engine. There are a number of variables that impact both the operating time and charge time, that must be taken into consideration when anticipating the performance of a specific battery.

Both battery packs are "consumable" items, and as such should be expected to have a gradual drop-off in performance (system operating time) over their life span. The system operating time numbers listed in this document are in reference to a "new" (optimum) battery.

Charging times will be significantly impacted by the temperature of the battery pack at the time of the start of the charging cycle. The intelligent PIC device that manages the charging process will disable, or reduce the rate of charge, as dictated by the battery pack's current temperature.

The total time that will be required for a battery to reach a full state of charge is impacted by a number of variables. These include:

1) Operating state of system (transducer in use: HV active)

2) Temperature of battery pack

3) Initial first-charge for Z-PAK:

- Z-PAK: (SmartCart battery)

Performance:

Typical system operation interval (on full charge):..... **2.5 - 3.0 Hours**

Charging:

Fast Charge Rate (5A):..... **5.0 hours** *(total)*

Step #1:.....**3.0 hours** – main charge

Step #2:.....**2.0 hours** – final top-off charge

Trickle-Charge Rate (i.e., hot battery state) ..... **16.0 Hours** *(worst-case)*

Recondition & Full Charge State:

Optimum (battery in cool state, and initial charge level near full)..... **8.0 Hours** *(total)*

Step #1:.....**0 to 5 hours -** to charge to full

Step #2:.....**2-3 hours** - to fully discharge

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Step #3:.....**4-6 hours** - to fully recharge

Worst-case (battery in hot state, and initial charge level near zero) ..... **13.0 Hours**

- Scan Engine Removable Battery Pack *(38Wh version)*

Performance:

Typical system operation interval (from full charge): ..... **35-45 minutes**

Charging:

Fast-Charge Rate (3A) – HV not active (no transducer in use) ..... **2.0 Hours** *(approx)*

Trickle-Charge Rate (1A) – HV active (transducer in use)..... **5.0 Hours** *(approx)*

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

20 REPAIR PROCEDURES

20.1 Foreword

The repair procedures described in this portion of the Service Manual should be performed ONLY by a ZONARE trained service personnel (Service Engineer, Bio-Med, etc.).

20.2 Recommended Tools

Tool Description	Size	Qty.	Where used
Screwdriver, flat blade, small tip, extra-long	3mm blade, 12” shaft, thin blade	1	SmartCart Display Monitor
Screwdriver, flat blade, medium tip, std. length	3mm blade, 6” shaft, std. thick	1	General use
Screwdriver, Phillips, large tip, std length	#3, 6” shaft	1	Power supply module
Screwdriver, Phillips, med. tip std length	#2, 6” shaft	1	SmartCart Assy general
Screwdriver, Phillips, large tip, std length	#3, 6” shaft	1	Power supply module
TORX Screwdriver (T10)	T10 x 60	1	miniCart
Pliers, Needle Nose, Standard jaws	3” long jaws	1	miniCart keyboard
Pliers, Diagonal Cutters, small	Small jaws	1	General cutting of tie wraps, etc.
Nut-Driver Set (U.S.)	Multi-sizes	1 set	SmartCart Display Monitor
Socket Wrench Set, (10mm, 13mm)	Multi-sizes	1 set	SmartCart gas spring (13mm), miniCart hub (10mm)
Combination Wrench Set (Metric)	19mm	1	miniCart caster
Allen Wrench Set (Metric)	2.5mm, 5mm	1	miniCart display, SmartCart gas spring
Flashlight, Mini-Mag	6” size	1	Illuminating tight access areas
Magnetic pick-up tool	Telescoping	1	Retrieval of hardware

20.3 Hardware Service/Replacement Procedures (SmartCart)

20.3.1 Casters - Removal/Replacement (SmartCart)

Required Parts

- P/N: 32865-00 .....Caster, 5 Inch, Dual Wheel, Directional/Brake Lock (Front)
- P/N: 32867-00 .....Caster, 5 Inch, Dual Wheel, Full Swivel (Rear)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Required Tools/Equipment

- Medium-tip flatblade screwdriver

Overview of Procedure

- Remove Caster
- Set Brake and/or Swivel Lock position
- Install Caster

Removal of the Caster:

STEPS:

1. Ensure the Z.ONE*Ultra* is powered "OFF".
2. Place AC circuit breaker, located at the rear of the SmartCart, in the "**0**" (Off) position.
3. Disconnect the main AC power cord from the rear of the SmartCart.
4. Undock the scan engine from the Cart, and set aside.
5. Fold the LCD display screen down to a horizontal position, for protection from moving during tilting of Cart.
6. Lock the brake mechanism (front wheels) to keep the Cart from rolling.
7. While supporting the display/display arm from swinging to the side, on a soft surface (carpet, etc.) tilt the Cart forward, until it is horizontal, resting on the two front push handles for support

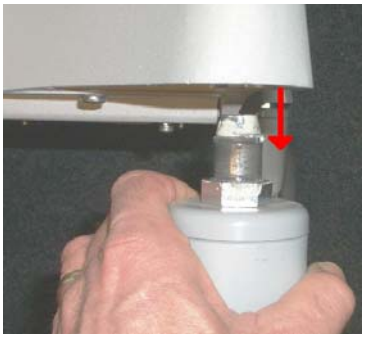
CAUTION

⚠ *The Cart may be heavy and care should be taken while tilting forward, use two people if necessary to avoid injury.*

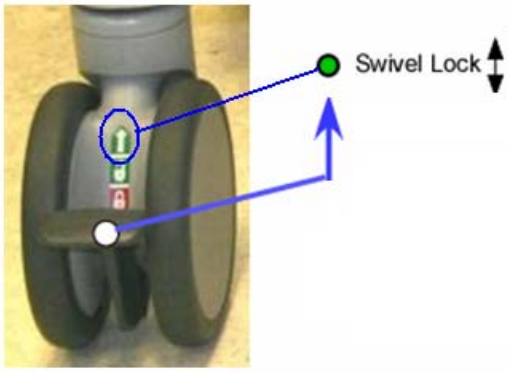
8. Using a flatblade screwdriver, gently wedge it between the cosmetic sleeve and the wheel mating surface at the bottom of the SmartCart.

9. Using the screwdriver tip as a wedge, work the screwdriver to extract the wheel from the socket, and pull it directly away from the SmartCart for removal. (Note: the wheel installation is a "press-fit").

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



10. For front wheels: Place the locking lever into the full up (wheel locked into straight ahead) position.



11. For front wheels: Align the replacement wheel such that the corresponding flat side of the hex nut on the wheel shaft aligns with the flat edge at the front of the mounting point on the frame of the SmartCart.
12. Firmly “press” the wheel into place, for re-installation.
13. Once installation is complete, Tilt the Cart back up onto its wheels, and release the brake mechanism.
14. Verify smooth operation and pivoting of the Cart through all movements.
15. Verify that the brake functions correctly and that each caster locks and the brake functions when it is set.

20.3.2 19” Flatpanel Display - Removal/Replacement (SmartCart)

Required Parts

- 85021-00 Display Assy, SmartCart
- 32856-00 Overlay, SmartCart Display
- Aluminum tape (EMC insulation)

Overview of Procedure

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- Removal of Display Assy
- Installation of Display Assy
- Verification of LCD Display, Speakers, and Microphone

Required Tools/Equipment

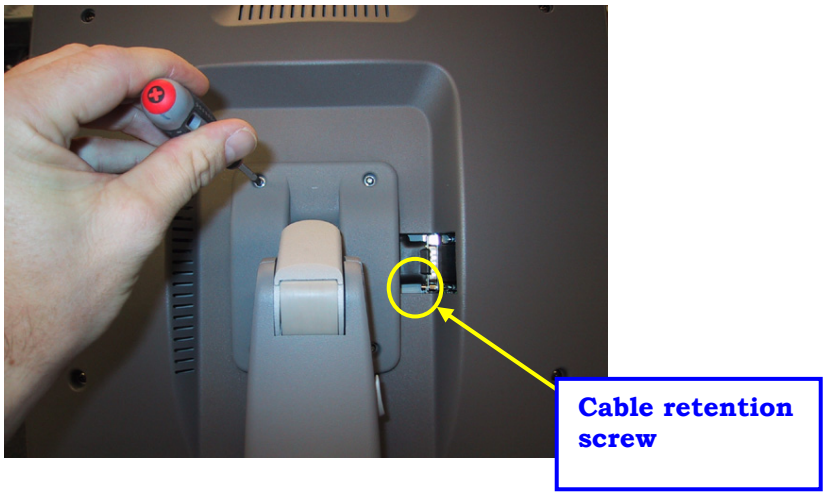
- Long handled flat-blade screwdriver (3mm width blade, 12” shaft, thin blade)
- 9/32” Nut Driver or wrench
- #1 Phillips Screwdriver

Procedure

Removal:

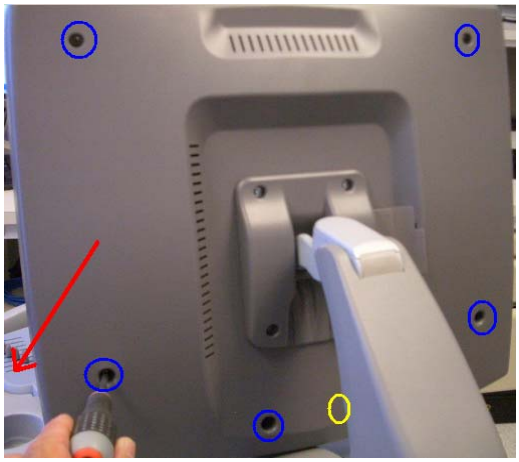
STEPS:

1. Ensure the Z.ONE*Ultra* is powered “OFF”.
2. Place AC circuit breaker, located at the rear of the SmartCart, in the “**0**” (OFF) position.
3. Disconnect the main AC power cord from the rear of the SmartCart, or unplug from the wall source.
4. Remove the four (4) Phillips-head screws that are retaining the plastic display hinge back cover, and remove back cover and center insert sleeve.

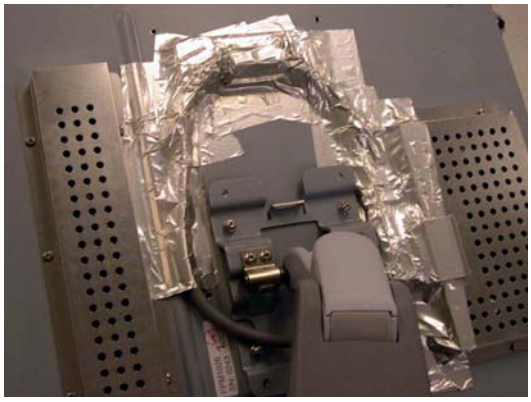


5. Remove the (6) Phillips-head screws that are retaining the plastic display hinge back cover, and remove back cover and insert.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



6. Remove the aluminum tape securing the video cable to the display.



7. Using the long straight slot screwdriver – loosen the display cable retention screw.
8. Remove the four (4) 9/32” Nuts with captive washers that attach the display to the metal hinge assembly, removing the display arm ground cable from the bottom-left threaded stud.

9. Tilt the top of the display towards the rear of the cart to support the LCD Display while removing the last screw.
10. Taking weight off the display, slide it off the threaded studs on the metal hinge assy.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

11. While still supporting the display, gently remove the video cable from the display (this may need to be gently pried away with a screwdriver)
12. Once the cable is free, set the display aside and prepare for installation.

Installation:

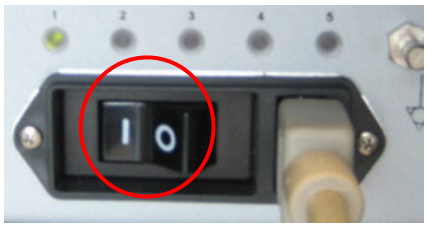
STEPS:

1. Reconnect the Display Cable to the connector on the display.
2. Slide the excess cable under the plastics and route in the same fashion prior to removal
3. Align the display (4 threaded shafts) with the metal hinge assy. Route the display cable carefully in the notch on the left of the hinge to avoid cable damage.
4. Reattach the display arm ground cable to the bottom-left stud
5. Reinstall the four 9/32" nuts and tighten. Ensure that the display cable and ground cable are not pinched.
6. Using the long straight slot screwdriver – tighten the display cable retention screw. (See Figure 1 – Location A)
7. Reinsert the display hinge plastic cover –
   - Insert the bottom piece first, aligning the screw holes and cable
   - Slide the top cover down
8. Tighten the four (4) Phillips-head screws that are retaining the plastic display hinge back cover, and remove cover and insert.

System Verification:

STEPS:

1. Reconnect the main AC power cord from the rear of the SmartCart or plug into the wall source.
2. Place AC circuit breaker, located at the rear of the SmartCart, in the "**1**" (On) position.



3. Ensure the scan engine is docked in the SmartCart. LED 1 will blink quickly and LED 5 will remain on.
4. Power on the system.
5. Verify that the LCD display is functioning correctly by watching the boot and verifying that normal imaging is displayed after fully booted.
6. Attach a transducer (if not already connected) and enable Doppler (PW) mode.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

13. Turn PW Gain up to obtain a filled in spectral trace with excess noise (this will generate white noise for the speakers)
14. Turn the Volume up (Clockwise) and verify that the white noise is audible from both speakers.
15. If possible – scanning with actual Doppler flow is ideal, but not required.
16. Verification of microphone
11. Verification is complete – return system to normal operation.

20.3.3 Display Arm w/Cables - Removal/Replacement (SmartCart)

Required Parts

- 85086-00 Display Arm w/Cable
- Small tie-wraps (2)

Overview of Procedure

- 19” Flatpanel Display - Removal/Replacement
- Removal of the Display ARM
- Installation of Display ARM
- Verification of LCD Display, Speakers, and Microphone

Required Tools/Equipment

- Long handled flat-blade screwdriver (3mm width blade, 12” shaft, thin blade)
- #2 Phillips Screwdriver – Stubby
- #1 Phillips Screwdriver
- 9/32” Nut Driver or wrench
- 7/64” Allen Wrench
- Wire Cutters

Procedure

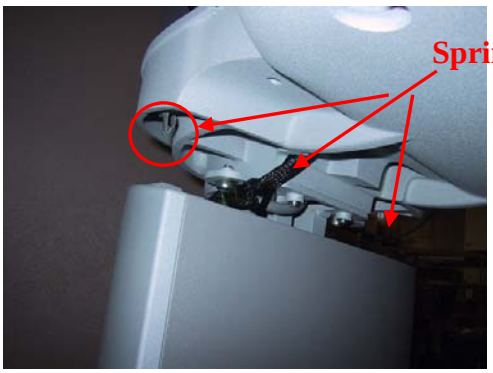
Opening Chassis Cosmetics:

STEPS:

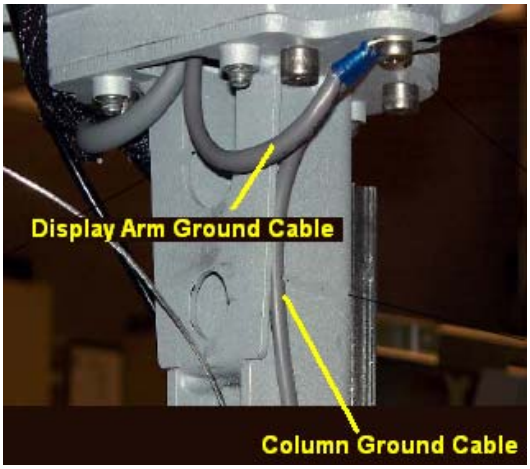
1. Ensure the **z.one*Ultra*** is powered “OFF”.
2. Place AC circuit breaker, located at the rear of the SmartCart, in the “OFF” position.
3. Disconnect the main AC power cord from the rear of the SmartCart or unplug from the wall source.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

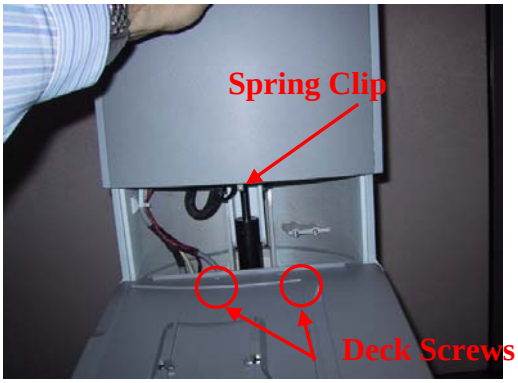
4. Using the side of the hand – firmly knock the side of the chassis cosmetic sleeve loose. There are 3 spring clips that retain it at the top. If it does not come free – gently use the flat blade screwdriver to pry the cosmetics loose (use tape on the blade to avoid marring the chassis surface).



5. Remove the retaining screw, and disconnect the display arm ground cable from its mounting point on the bottom of the upper support plate.



6. Slide the outer cosmetic chassis sleeve down and grab the inner sleeve front panel along with the outer sleeve at the same time from above.
7. Lift both the Inner and Outer sleeve to gain access to the Scanner Deck retention screws. There is one spring clip in the center which holds the inner panel down.

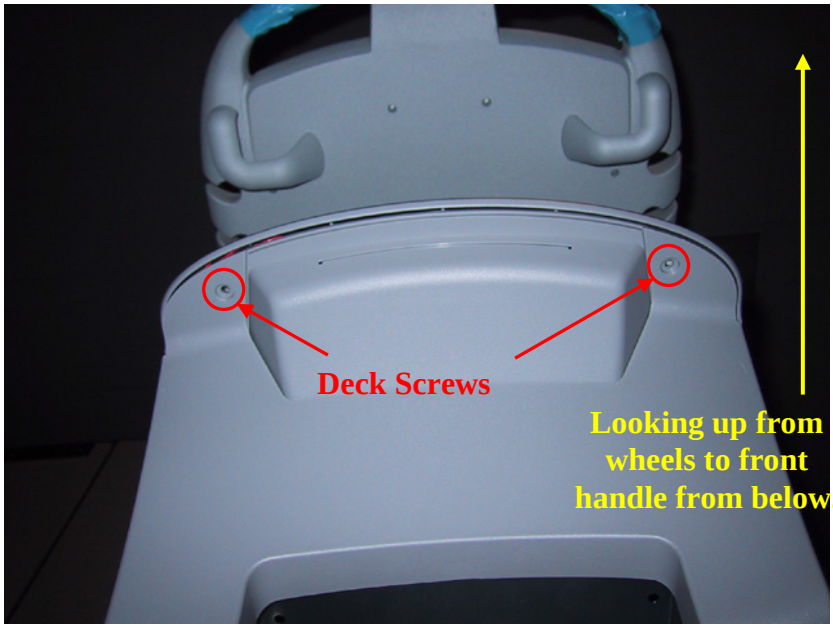


"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

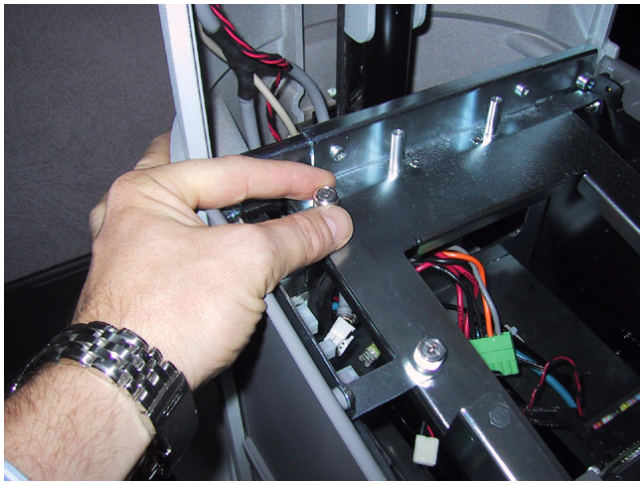
5.2 Removing Scanner Deck & Removal of Display Cables at Main Board:

STEPS:

1. Ensure the **z.one*Ultra*** is powered "OFF".
2. Remove the two (2) Phillips screws on top Scanner Deck.
3. Remove the two (2) Phillips screws on bottom front CEE cosmetics to the Scanner Deck.



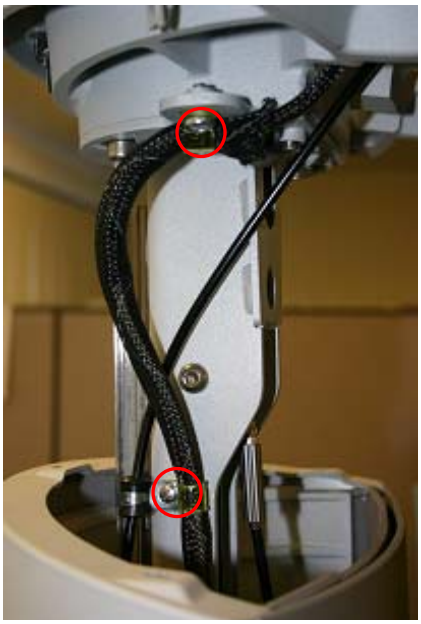
4. Partially lift the Scanner Deck off the Electronics Enclosure and move to the right side.
5. Remove the Left CEE Cosmetic panel by the Main Board – loosen the two thumbscrews and lift straight up to remove.



"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

6. Disconnect the Scanner Deck wiring from the Main Board – taking note of the connector locations for reassembly. You may need to cut ty-wraps securing cables to chassis
7. Set the Scanner Deck aside.
8. Disconnect the two (2) connectors for the Cart Display Monitor, at the power (J5) and video signal (J1) connectors on the Main Board.

   IMPORTANT NOTE: Be very careful when removing the video cable connector (J1), as the wires are very fragile!
9. Remove the two p-clamps and ty-wrap securing the cable bundle within the center column.



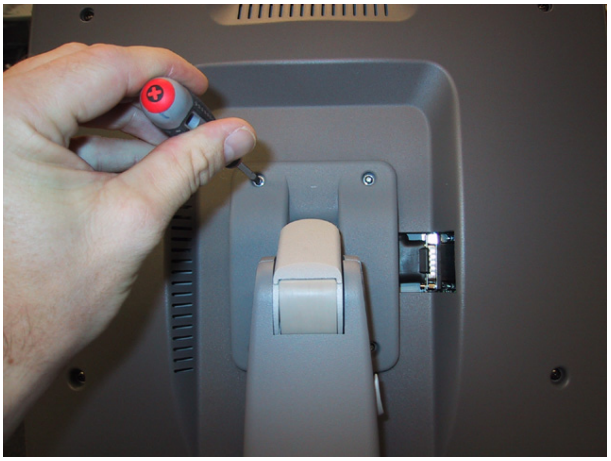
10. To remove the display cable from the netted stretch shielding through which it is routed (with other system cables) slide the netted stretch shielding together down its length, to cause the shielding to expand in diameter sufficiently to slide the Main Board end connectors out of the shielding.
11. Pay special attention to the routing (looping) and retention (cable tie) of the display cable, within the upper area of the main column of the SmartCart, in order to reproduce this layout during re-assembly.

Display Removal:

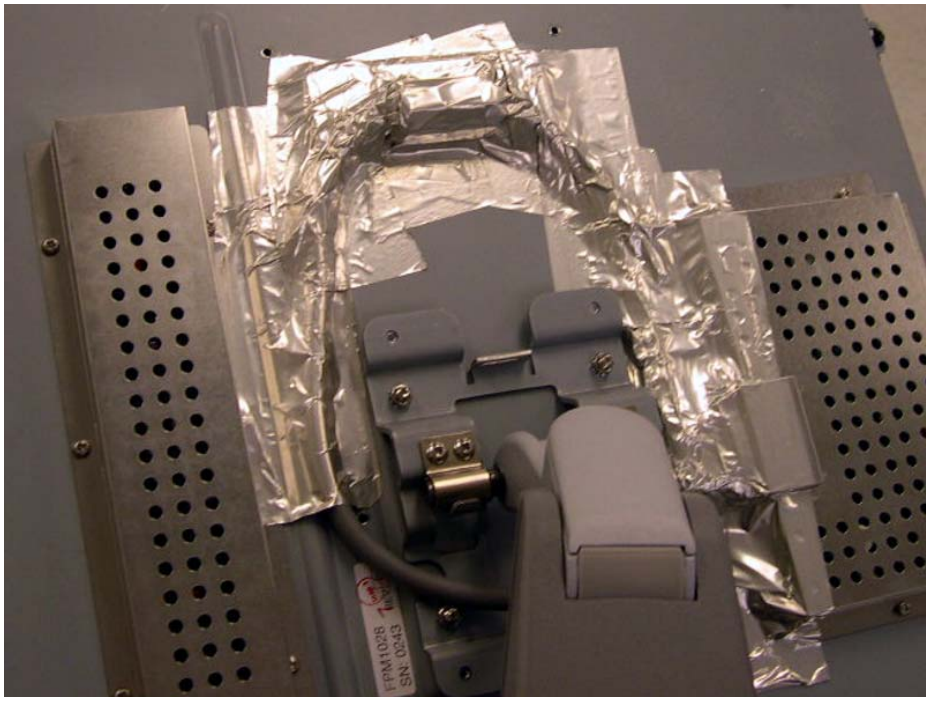
STEPS:

1. Remove the four (4) Phillips-head screws that are retaining the plastic display hinge back cover, and remove cover and insert.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

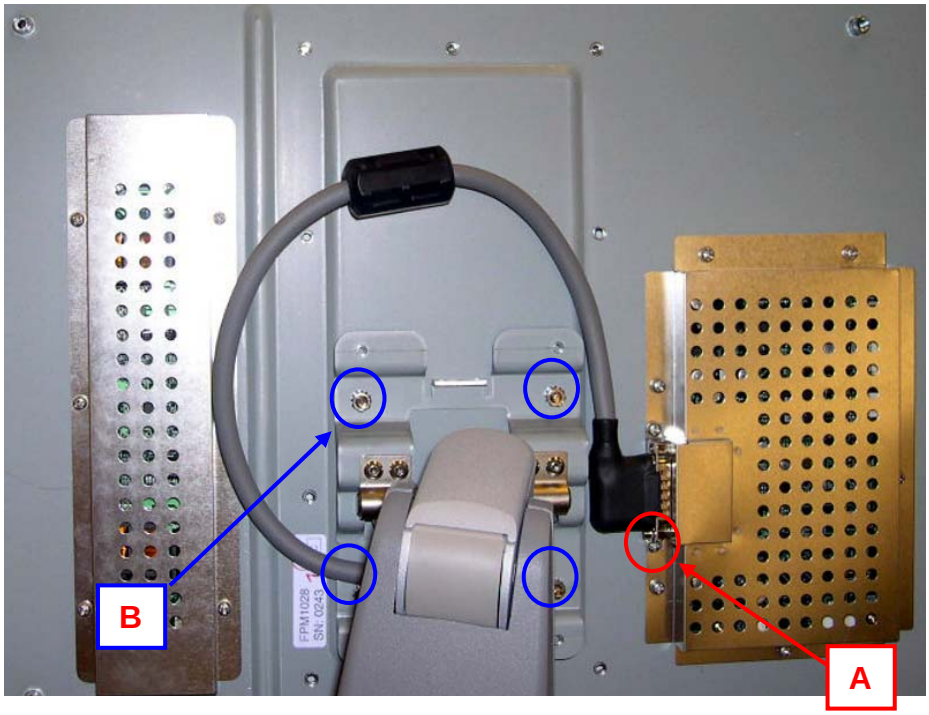


2. Remove the (6) Phillips-head screws that are retaining the plastic display hinge back cover, and remove cover and insert.
3. Remove the tape securing the video cable to the display.



4. Using the long straight slot screwdriver – loosen the display cable retention screw (See Location A).

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



5. Remove the four (4) 9/32” Nuts with captive washers that attach the display to the metal hinge assembly. Tilt the top of the display towards the rear of the cart to support the LCD Display while removing the last screw (See Location B).
6. Tilt the top of the display towards the rear of the cart to support the LCD Display while removing the last screw.
7. Slowly lift the Display off the metal hinge assy – while supporting it, gently remove the display cable from the display (this may need to be gently pried away with a screwdriver)
8. Once the cable is free, set the display aside and prepare for installation

Display Arm Removal:

STEPS:

1. Remove the four (4) 6mm Allen Head Bolts which hold the display arm to the chassis.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

2. While gently pulling the video cable free from the system, remove arm assembly.

Display Arm Installation:

STEPS:

1. Route the display cables and ground cable down into the chassis of the SmartCart, allowing adequate slack in the required areas.
2. Secure the cables with tie-wraps, as per locations removed previously during the disassembly process.
3. Reinstall the four (4) 6mm Allen Head screws to secure the display arm to the chassis.

Display Assy Installation:

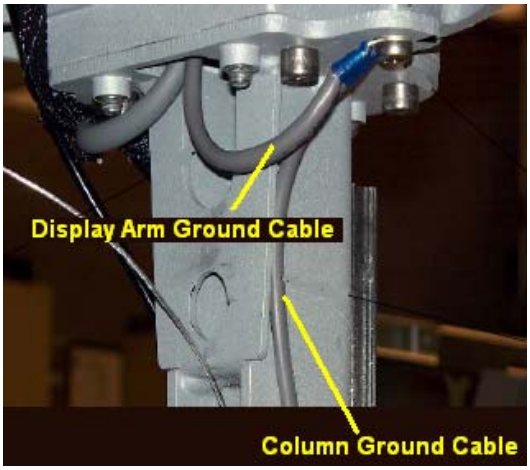
STEPS:

1. Reverse the steps performed in the removal process, for installation.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Display Cables Reconnection & Scanner Deck Installation:

STEPS:



1) Reattach the display arm ground cable, and column ground cables to their mounting point on the bottom of the upper support plate, using the retaining screw.
2) Reconnect the Display's power and video cables to the appropriate connectors on the Main Board.

CAUTION

The J1 video connector on the Main Board is a VERY high-precision style connector, with very fine/fragile pins, and is surface-mounted to the PC board.

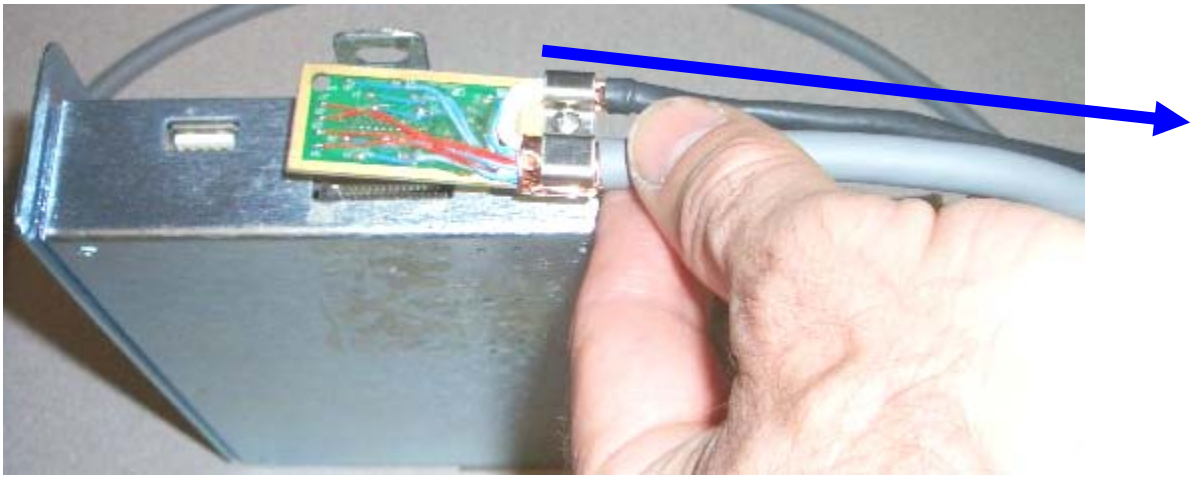
As such, extreme care MUST be observed to ensure proper alignment of the cable prior to pressing into place, and only light pressure should be required for fully seating cable in connector receptacle.

Failure to do so may result in permanent damage to the connector; requiring replacement of the entire Main Board assembly.

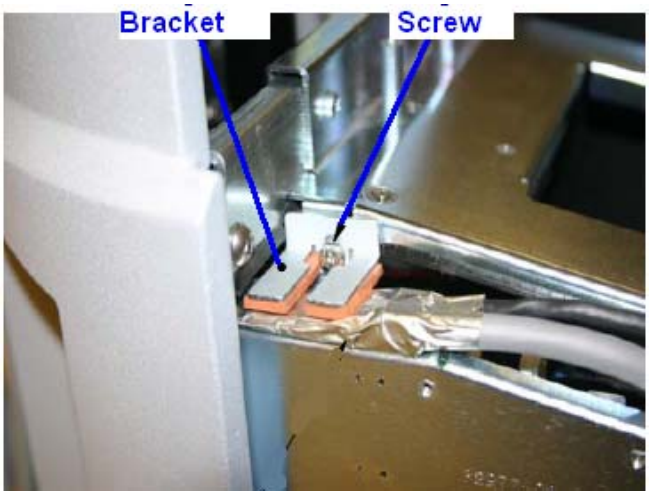
3) **IMPORTANT**: IF the existing video cable and connector that was in the "old" display arm was the previous generation design, it will look significantly different then the "new" cable design that is in the replacement arm.

   The direction of the main cable orientation at the time the connector on the cable is installed in the mating connector on the Main Board, is facing in the opposite direction (toward the front of the system), and is installed as shown below:

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



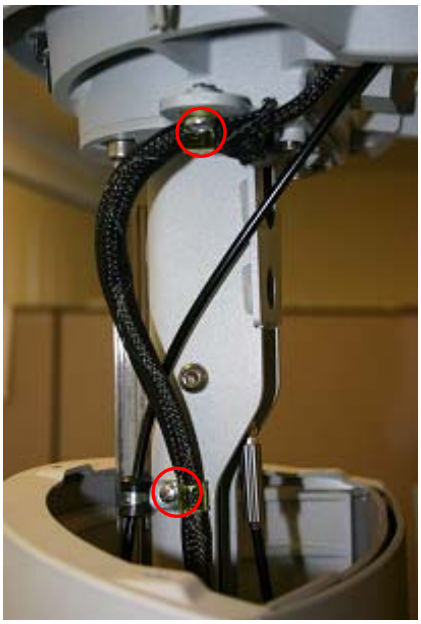
NOTE: IF the video connector on the replacement display arm assembly is of a different “type” (flat PC board type) then the original cable, install the “Cable Hold Down Bracket” P/N 33383-00 (provided with the new display arm kit) in the location as shown in the illustration below. The bracket is secured using the upper mounting screw for the Main Board assembly



4) Secure the connector/cable with tape to the chassis, to ensure it does not come lose.

5) Secure cables in center column as shown below.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

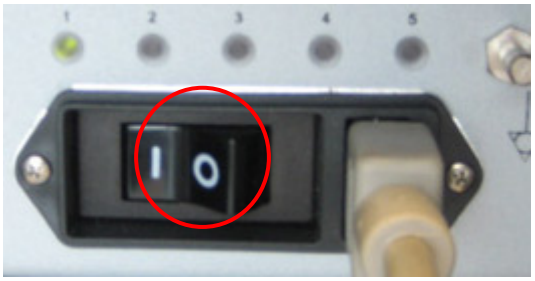


6) Reassemble the Scanner Deck area, by reversing the removal procedure.
7) Slide the chassis cosmetic sleeve and insert panel back into place on their respective spring clips.

Verification of Display, Speakers, and Microphone:

STEPS:

1) Reconnect the main AC power cord from the rear of the SmartCart or plug into the wall source.
2) Place AC circuit breaker, located at the rear of the SmartCart, in the "ON" position.



3) Ensure the z.one is docked in the SmartCart.
4) Energize the SmartCart (*Ultra* System).
5) Verify that the LCD display is functioning correctly by watching the boot and verifying that normal imaging is displayed after fully booted.
6) Attach a transducer (if not already connected) and enable PW mode.
7) Turn PW Gain up to obtain a filled in spectral trace with excess noise (this will generate white noise for the speakers)
8) Turn the Volume up (Clockwise) and verify that the white noise is audible from both speakers.
9) If possible – scanning with actual Doppler flow is ideal, but not required.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

10) Verification of microphone – TBD.

11) Verification is complete – return system to normal operation.

20.3.4 Z-PAK Battery - Removal/Replacement (SmartCart)

Required Parts

- P/N: 85031-00 Assy, Battery Pack, Gen II Cart

Required Tools/Equipment

- #2 Phillips Screwdriver
- #3 Phillips Screwdriver

Overview of Procedure

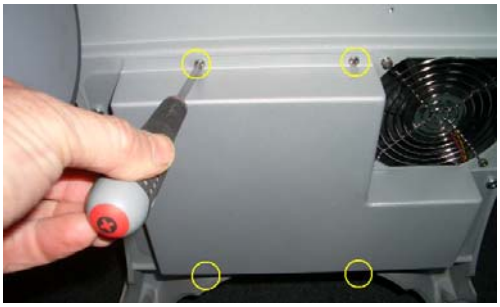
- Removal Battery Pack
- Re-installation of Battery Pack
- Verification of system operation

Battery Pack Removal:

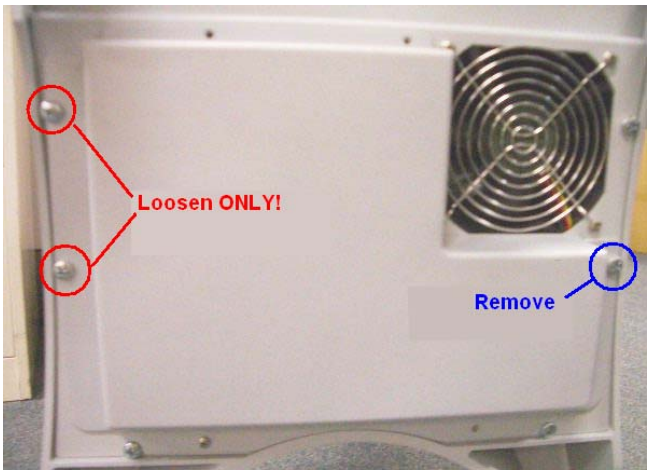
STEPS:

1. Ensure no Scan Engine/Module is docked
2. Place AC circuit breaker, located at the rear of the SmartCart, in the “OFF” position.
3. Disconnect the main AC power cord from the rear of the SmartCart.
4. Put the User Interface in the highest position.
5. Set the front caster brakes to prevent system from rolling.
6. Undock the scan engine from the Cart, and set aside.
7. The Battery Pack is located under the system. For the easiest access, tilt the entire system forward until is in horizontal position, resting on the front-side handles.
8. Remove the four (4) smaller #2 Phillips-head screws that are retaining the Battery Pack to the bottom of the SmartCart.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



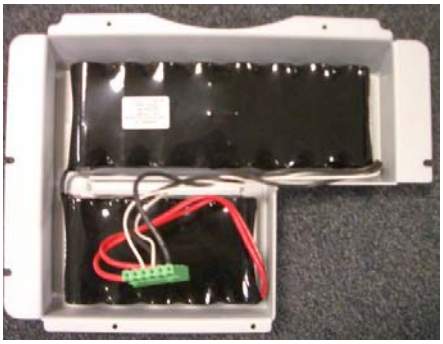
9. Remove the larger #3 Phillips-head screw, located on the right side of the mounting of the Battery Pack to the bottom of the SmartCart (leaving the last two (2) #3 Phillips-head screws, on the left side of the battery pack, still in place).



10. Remove the larger #3 Phillips-head screw, located on the right side of the mounting of the Battery Pack to the bottom of the SmartCart (leaving the last two (2) #3 Phillips-head screws, on the left side of the battery pack, still in place).
11. Slightly **loosen** (but DO NOT REMOVE) the remaining two (2) large #3 Phillips-head screws (on the left side of the battery pack), while supporting the weight of the battery pack with your hand.
12. While still supporting the weight of the battery pack, slide it to the right to enable the slotted holes in the cover to come free from the last two mounting screws,

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

13. Remove the larger #3 Phillips-head screw, located on the right side of the mounting of the Battery Pack to the bottom of the SmartCart (leaving the last two (2) #3 Phillips-head screws, on the left side of the battery pack, still in place).
14. Lower the battery pack slightly to enable access to the connector at the end of the battery pack power cable, and unplug the connector from the power supply on the SmartCart.
15. Remove the battery pack.



Battery Pack Re-Installation:

CAUTION

*AC Power **MUST** be present and the circuit breaker MUST be in the "ON" (power applied to the power supply of the SmartCart), at the time the Z-PAK is connector is plugged back into the power supply connector.*

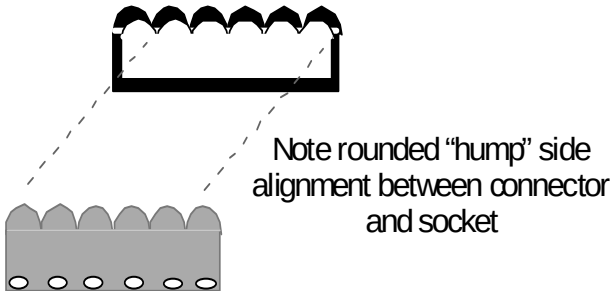
Failure to do so may result in a high enough potential arcing during connection, that may damage components on the power supply!

STEPS:

1. Connect the main AC power cord to the rear of the SmartCart and a wall source.
2. Place AC circuit breaker, located at the rear of the SmartCart, in the "ON" ("**1**" pushed in) position.
3. While holding the battery pack in position, plug the power connector into the receptacle on the bottom of the power supply.
4. While still supporting the weight of the battery pack attach the power cable to the mating connector on the bottom side of the power supply module on the SmartCart.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

***Warning**: Be very careful to have the proper connector to socket orientation (note the rounded humps on one side, as shown below) when installing this cable. DO NOT FORCE connection, as this will damage connector and internal electronics.*



5. While still supporting the weight of the battery pack, slide the slotted holes in the left side of the cover onto the two (2) loosened mounting screws on the left side of the power supply module.
6. Reinstall all mounting hardware to complete the installation.

IMPORTANT

*The battery fuel gauge resides on the Power Supply Module in the SmartCart (not in the Z-PAK. As a result it is **MANDATORY** that the "**Z-PAK Recondition**" process be run when a Z-PAK (or Power Supply Module) has been replaced. Failure to do so will result in compromised (reduced) Z-PAK battery run times.*

Z-PAK Battery Recondition:

STEPS:

1. Follow the PIC Reset and Z-PAK Recondition procedures provided in Chapter 18

System Verification:

STEPS:

1. Power on the SmartCart and perform a series of basic user operations, to verify normal system functionality.
2. Verify that the battery status ICON, on the upper-left corner of the display of the SmartCart, shows a current status.
3. Verification is complete – return system to normal operation.

20.3.5 Main Power Supply Module - Removal/Replacement (SmartCart)

Required Parts

- P/N: 85025-00 ..... Power Supply Module, SmartCart

Overview of Procedure

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- Removal/Re-installation Z-PAK Battery Plate
- Removal/Replacement of Power Supply Module
- System verification

Required Tools

- 9/32” Nut Driver or wrench
- #2 Phillips Screwdriver

Procedure

Battery Pack Removal:

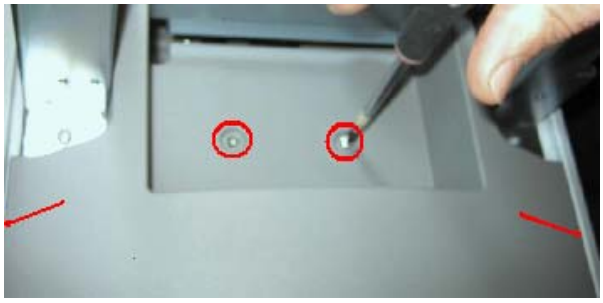
STEPS:

1. Perform removal process as described in Z-PAK Battery Plate removal procedure (included previously in this section of the manual).

Power Supply Module Removal:

STEPS:

1. Ensure the Z.ONE*Ultra* is powered “OFF”.
2. Place AC circuit breaker, located at the rear of the SmartCart, in the “**0**” (OFF) position.
3. Disconnect the main AC power cord from the rear of the SmartCart or unplug from the wall source.
4. Undock the scan engine from the Cart, and set aside.
5. Put the User Interface in the highest position.
6. Set the front caster brakes to prevent system from rolling.
7. To allow for removal of the AC power cable (used to power an on-board USB printer device, and an item that is included with the complete Power Supply Module) from the SmartCart, the lower access cover panel will need to be removed.
8. Remove the two Phillips-head screws that retain the lower access cover panel, in the printer mounting bay area. This panel is located under the scanner Scanner Deck, at the front of the SmartCart.



"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

9. Cut any plastic tie-wraps that retain the AC power cable to the chassis, and free it from its mounting for later removal with the Power Supply Module.
10. The Power Supply Module is located under the system. For the easiest access, tilt the system so it rests on the front handles, exposing the bottom of the unit.
11. Remove the eight (8) Phillips-head screws retaining the power supply module to the bottom of the SmartCart and remove module.

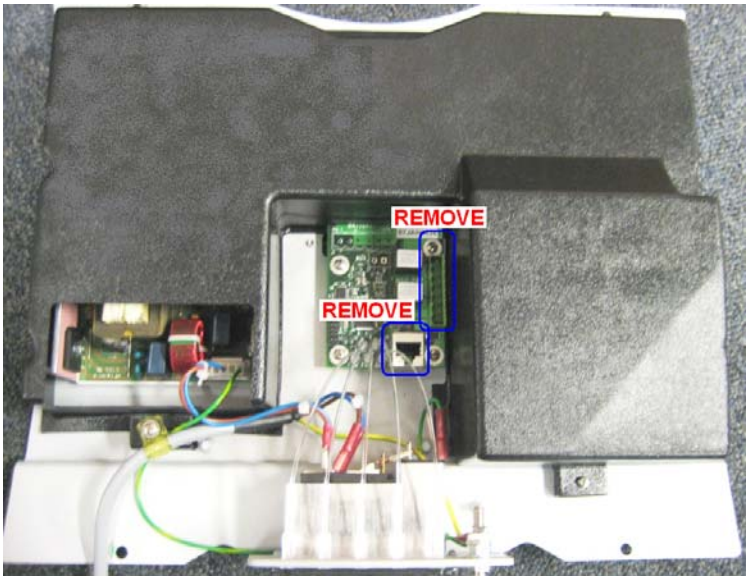
    NOTE: Support the weight of the power supply with your free hand, while removing the final screw.

12. Gradually lower the Power Supply Module approximately 3” to provide access for disconnecting the cabling.
13. Reach in and disconnect the following cable connections.

    a. Disconnect the following two (2) cables

    - Main DC Power Out – Molex
    - Blue-colored, RJ-45 quick-disconnect

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



14. Once the cables are free, set the Power Supply Module aside and prepare for installation.

Installation:

STEPS:

1. Reconnect the Cables to the replacement Power Supply Module.
2. Route the printer AC power cable into the chassis, and out the front access panel.
3. Tuck cables back into chassis and position Power Supply Module for installation.
4. Reinstall the eight (8) Philips head screws. Ensure that the Power Supply Module is securely connected.
5. Reattach the AC power cord to the socket at the rear of the Power Supply Module
6. Reinstall Z-PAK battery pack (if system equipped with this option), following the steps detailed in Z-PAK Replacement Procedure section of this manual.

Important Note - Battery Pack Re-Installation:

CAUTION

⚠

*AC Power **MUST** be present and the circuit breaker MUST be in the "ON" (power applied to the power supply of the SmartCart), at the time the Z-PAK is connector is plugged back into the power supply connector.*

Failure to do so may result in a high enough potential arcing during connection, that may damage components on the power supply!

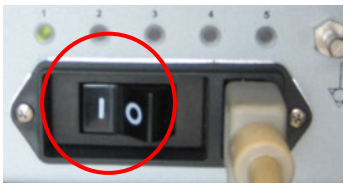
7. Tilt system back onto the casters.

System Verification:

STEPS:

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

1. Reconnect the main AC power cord from the rear of the SmartCart or plug into the wall source.
2. Place AC circuit breaker, located at the rear of the SmartCart, in the "**1**" (ON) position.



3. Ensure the scan engine is docked in the SmartCart. LED 1 will blink quickly and LED 5 will remain on.
4. Energize the SmartCart.
5. Verify that the LCD display is functioning correctly by watching the boot and verifying that normal imaging is displayed after fully booted.
6. Attach a transducer (if not already connected) and enable PW mode.
7. Turn PW Gain up to obtain a filled in spectral trace with excess noise (this will generate white noise for the speakers)
8. Turn the Volume up (Clockwise) and verify that the white noise is audible from both speakers.
9. If possible – scanning with actual Doppler flow is ideal, but not required.
10. Verification is complete for non-Z-PAK equipped system. For Z-PAK equipped systems continue with following steps. .

IMPORTANT

*The battery fuel gauge resides on the Power Supply Module in the SmartCart (not in the Z-PAK. As a result it is **MANDATORY** that the "**Z-PAK Recondition**" process be run when a Power Supply Module has been replaced on a system equipped with a Z-PAK. Failure to do so will result in compromised (reduced) Z-PAK battery run times.*

Z-PAK Battery Recondition:

STEPS:

1. Follow Z-PAK Recondition procedure provided in Chapter 18

20.3.6 Scanner Deck, w/Cables - Removal/Replacement (SmartCart)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

w/o MPT Option w/MTP

Required Parts

- P/N: 85076-00 ..... Assy, Scanner Deck, w/Cables – w/o MTP Option
- P/N: 85118-00 ..... Assy, Scanner Deck, w/Cables – w MTP Option
- Small Cable Tie-wraps (Qty. 3)

Required Tools/Equipment

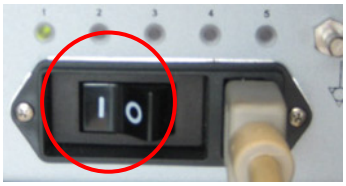
- #2 Phillips Screwdriver

Overview of Procedure

- Removal and replacement of Scanner Deck, w/Cables
- System verification

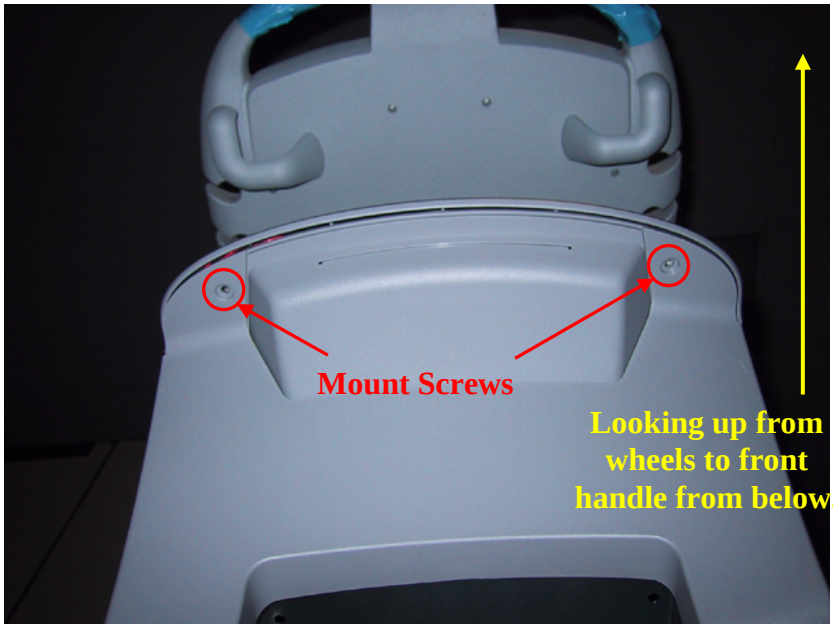
STEPS:

1. Ensure the Z.ONE*Ultra* is powered “OFF”.
2. Place AC circuit breaker, located at the rear of the SmartCart, in the “**0**” (OFF) position.

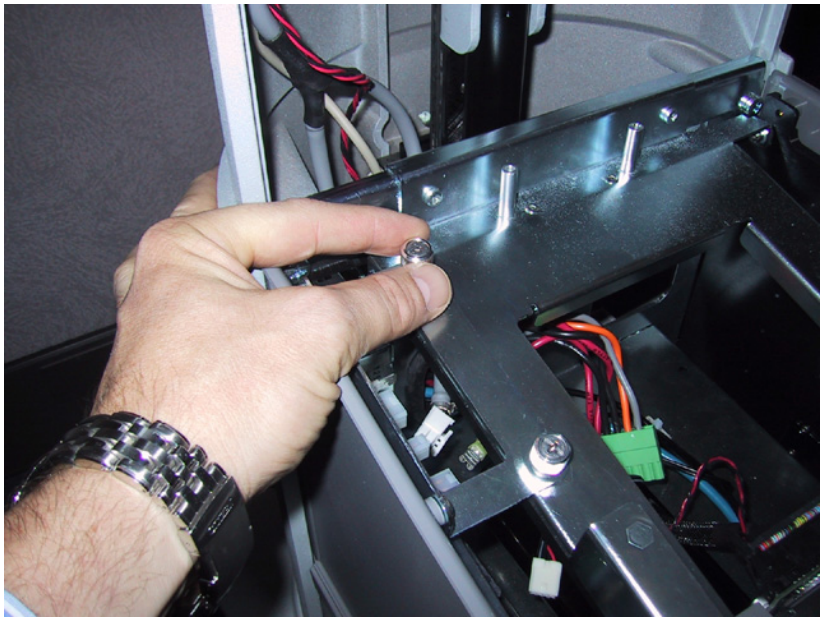


3. Disconnect the main AC power cord from the rear of the SmartCart or unplug from the wall source.
4. Undock the scan engine for the Scanner Deck, and set scan engine aside.
5. Remove the two (2) Phillips screws on top Scanner Deck.
6. Remove the two (2) Phillips screws on bottom front CEE cosmetics to the Scanner Deck.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



7. Partially lift the Scanner Deck off the Electronics Enclosure and move to the right side.
8. Remove the Left CEE Cosmetic panel by the Main Board – loosen the two thumbscrews (if present) and lift panel straight up to remove.

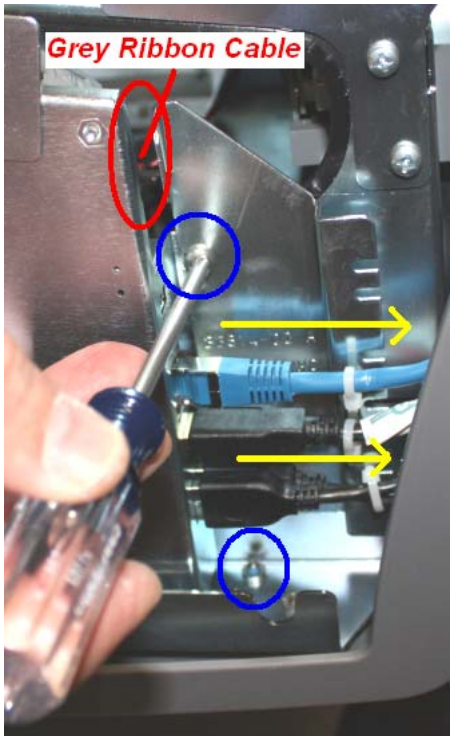


"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

9. Disconnect the Scanner Deck cables from the Main Board – taking note of the connector locations and cable orientation (red stripe, etc) for reassembly. Cut any tie-wraps that are retaining cables to the chassis.

NOTE: On newer systems utilizing a metal cable retention plate:

10. Loosen the two front Main Board mounting screws (as shown below) that secure the metal cable retention plate, to allow the plate to be slid forward to enable removal of flat grey ribbon cable for Scanner Deck.



11. Set the old Scanner Deck aside, and reverse removal steps for installing replacement Scanner Deck. Install new tie-wraps securing cables in same locations as were previously removed.

System Verification:

STEPS:

1. Reconnect the main AC power cord from the rear of the SmartCart or plug into the wall source.
2. Place AC circuit breaker, located at the rear of the SmartCart, in the "**1**" (ON) position.
3. Dock the scan engine on the SmartCart, and ensure it latches securely.
4. Press the power button on the Scanner Deck to energize the SmartCart, and allow it to fully boot.
5. Attach a transducer (if not already connected), and ensure basic imaging operation.
6. Verification is complete – return system to normal operation.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

20.3.7 OLED Display Board (User Interface Assy)- Removal/Replacement (SmartCart)

Required Parts

- 85095-00.....Assy, OLED Display Board

Overview of Procedure

- Removal and re-installation of User Interface Assy
- Replacement of OLED Display Board
- System verification

Required Tools/Equipment

- #1 Phillips Screwdriver

Procedure

UI Removal:

STEPS:

1. Ensure the Z.ONE*Ultra* is powered "OFF".
2. Place AC circuit breaker, located at the rear of the SmartCart, in the "**0**" (OFF) position.
3. Disconnect the main AC power cord from the rear of the SmartCart or unplug from the wall source.
4. Remove the eight (8) Phillips screws that secure the UI to the cast UI base. This will need to be accomplished from below using a Phillips screwdriver.

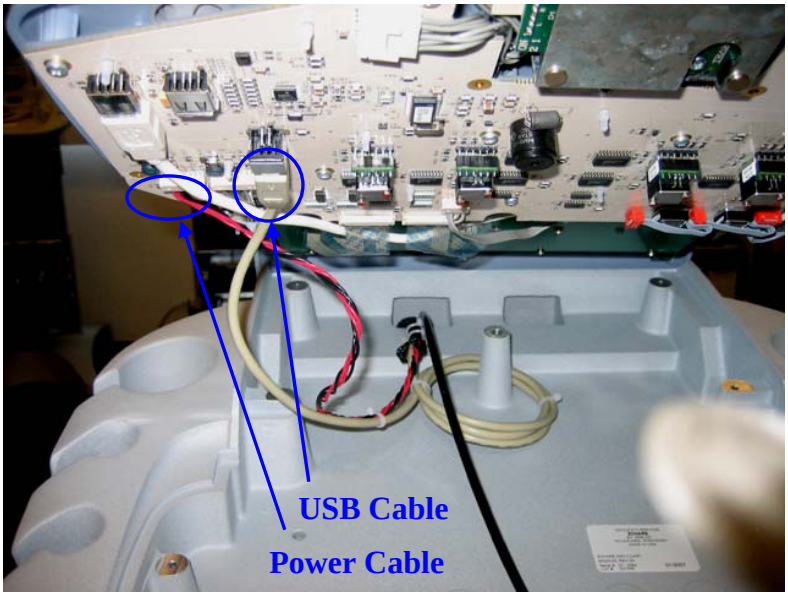
IMPORTANT NOTE

There are two open holes (shown in the figure below with a red "X") in the bottom of the UI panel that do NOT have screws inside. Be careful to NOT attempt to insert screws in these two holes, as the screw will fall up inside the UI housing

.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

5. While lifting the front of the User Interface up and exposing the underside of the UI, disconnect the USB and power cable from the UI assy.



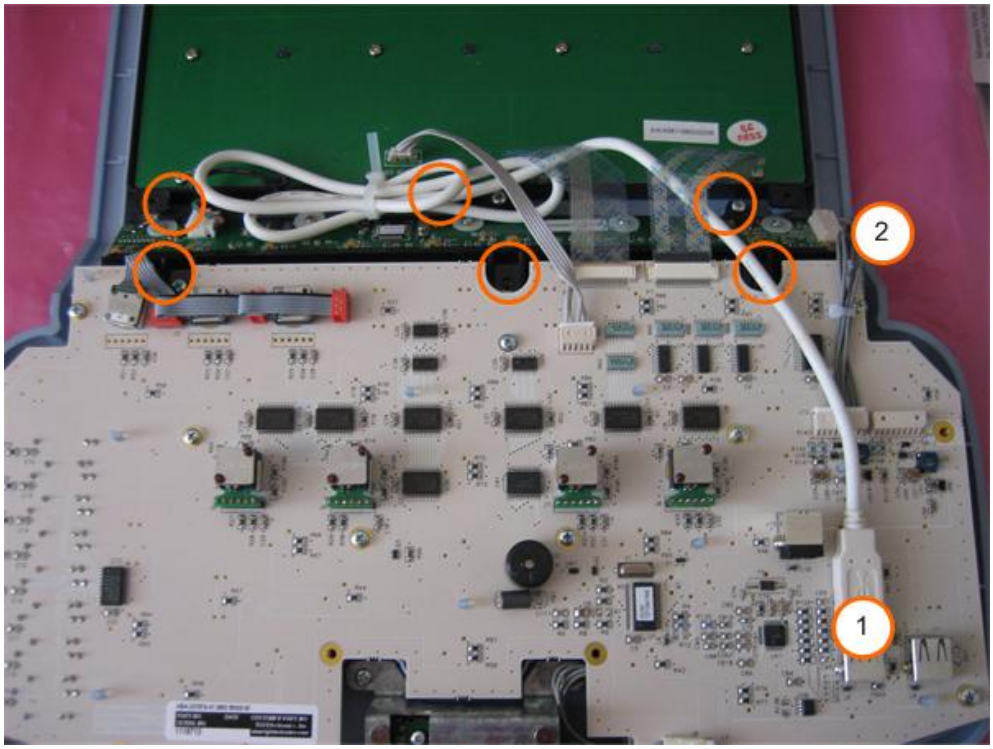
OLED Display Board Removal/Replacement:

STEPS:

1. Ensure the User Interface is removed per steps 1 thru 5 of User Interface Removal Procedure above.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

2. Set the user interface (keys facing down) on a surface that will not damage the surface of the User Interface.
3. Disconnect the USB cable from the User Interface assembly (location 1, shown below)
4. Disconnect the power cable from the OLED Display Board Assembly (location 2, shown below)
5. Remove the six (6) Phillips screws that retain the OLED assembly



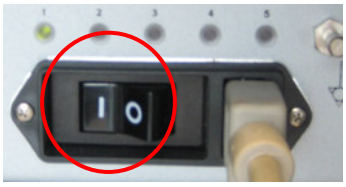
6. Slide the OLED Display Board Assembly out to the left (it is NOT necessary to disconnect the two flex cables going to the QWERTY keyboard, as the OLED assembly can be slid underneath for removal)
7. Reinstall OLED Display Board Assembly in the reverse order. Make sure to connect both cables.
8. Reinstall the User Interface Assy, by executing the earlier steps in reverse order, and proceed to System Verification.

System Verification:

STEPS:

1. Reconnect the main AC power cord from the rear of the SmartCart or plug into the wall source.
2. Place AC circuit breaker, located at the rear of the SmartCart, in the "**1**" (ON) position.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



3. Ensure the scan engine is docked in the SmartCart. LED 1 will blink quickly and LED 5 will remain on.
4. Energize the SmartCart
5. Attach a transducer (if not already connected)
6. Verify that the System is functioning correctly by performing a basic test. This test is comprised of the following:
7. Verify that the User Interface keys are functioning correctly by testing each of the keys.
8. Verify that the Softkey OLED displays are correct and functioning correctly based on the selected mode.
9. Verify the trackball functions correctly – testing both the horizontal and vertical axis.
10. Verification is complete – return system to normal operation.

20.3.8 User Interface Assembly - Removal/Replacement (SmartCart)

Required Parts

- 85808-00.....Assy, User Interface 2, SmartCart w/Trackball & Overlay
  - 85026-00.....Trackball Assy (if replaced separately)
  - 32854-00.....QWERTY Keyboard Assy (if replaced separately)

Overview of Procedure

- Removal and replacement of User Interface Assy
- System verification

Required Tools/Equipment

- #1 Phillips Screwdriver

Procedure

UI Removal/Replacement:

STEPS:

1. Ensure the Z.ONE*Ultra* is powered “OFF”.
2. Place AC circuit breaker, located at the rear of the SmartCart, in the “**0**” (OFF) position.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

3. Disconnect the main AC power cord from the rear of the SmartCart or unplug from the wall source.
4. Remove the eight (8) Phillips screws that secure the UI to the cast UI base. This will need to be accomplished from below using a Phillips screwdriver.

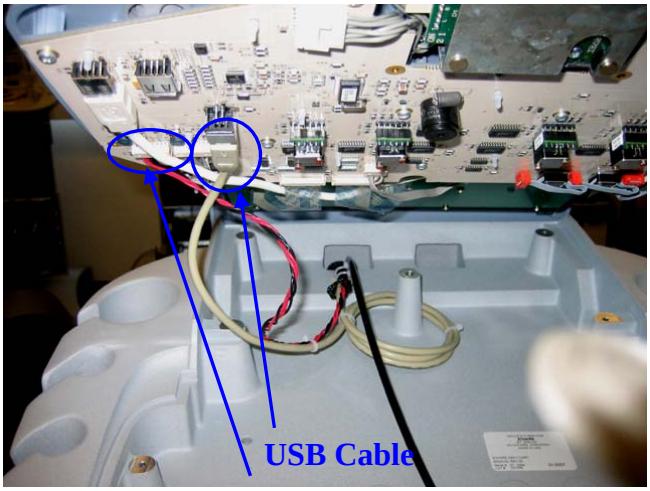
IMPORTANT NOTE

There are two open holes (shown in the figure below with a red “X”) in the bottom of the UI panel that do NOT have screws inside. Be careful to NOT attempt to insert screws in these two holes, as the screw will fall up inside the UI housing

.

5. While lifting the front of the User Interface up and exposing the underside of the UI, disconnect the USB and power cable from the UI assy.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



6. Reverse the steps above to install the replacement User Interface.
   - ⇨ If replacement of the trackball is required, proceed to Trackball Replacement steps **prior** to re-installing the User Interface (Refer to section below).
   - ⇨ If replacement of the QWERTY keyboard is required, proceed to QWERTY Replacement steps **prior** to re-installing the User Interface (Refer to section below).

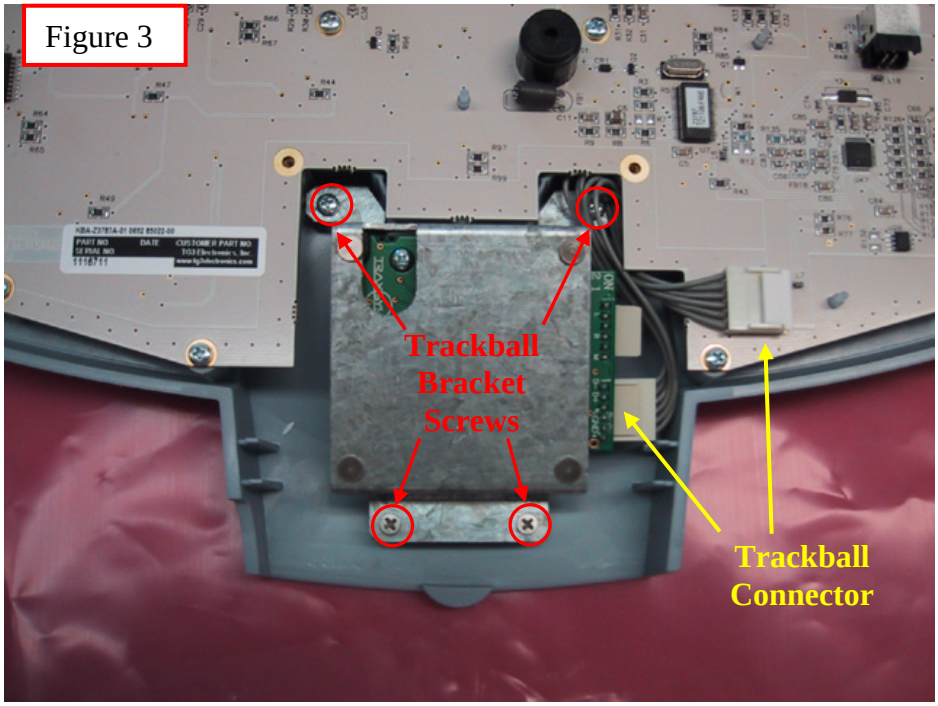
Trackball Removal/Replacement: (if changed separately)

STEPS:

1. Ensure the User Interface is removed per steps 1 thru 5 of User Interface Removal Procedure above.
2. Set the user interface (keys facing down) on a surface that will not damage the surface of the User Interface.
3. Disconnect the trackball from the trackball cable (on the UI side of the cable) and leave the other end connected to the Trackball. Pull the cable free so that the top-right screw is visible. (for connector location - See Figure 3)
4. Remove the four (4) Phillips screws that retain the Trackball (See Figure 3)

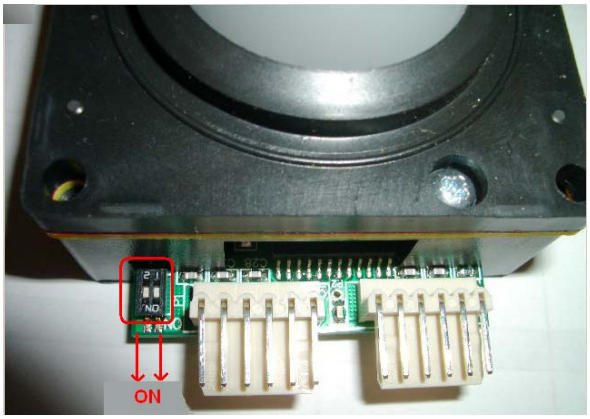
"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Figure 3



5. Pull the trackball straight up and remove (do not lose the spacers for each of the trackball bracket screws – 4 total)

   NOTE: Check the two (2) small white DIP switches on the new trackball, prior to installation, to ensure they are BOTH in the "ON" (**away** from the trackball) position (as shown below). Improper position of these switches can result in reversal (up/down vs. left/right) of operation.



6. Reinstall in the reverse order, taking care not to lose the trackball bracket spacers (these can be adhered to the bracket if necessary to ease replacement)
7. Reinstall the User Interface assembly in reverse order of the removal steps listed above and proceed to System Verification.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

NOTICE **Trackball Removal/Installation: Special Notes on new UI-3 and SP version assemblies**

Tolerances between the two notched slots in the printed circuit board of the user interface assembly, and the tangs on the metal framework surrounding the trackball assembly may be very close on early generation UI-3 and SP style systems.

Despite the current tight clearance, it **IS** possible to remove and re-install the trackball assembly **WITHOUT** having to remove the user interface circuit board. The process does requires angling the trackball assembly during the removal/installation process, and working to insert/remove ONE of the upper corners of the metal bracket at a time, at the recessed slots.

The area shown circled in the illustration below is the location the metal bracket where the clearance should be monitored during this process. Using a flat blade screwdriver to slightly flex the PC board tab in this area, during the removal/installation, may help.

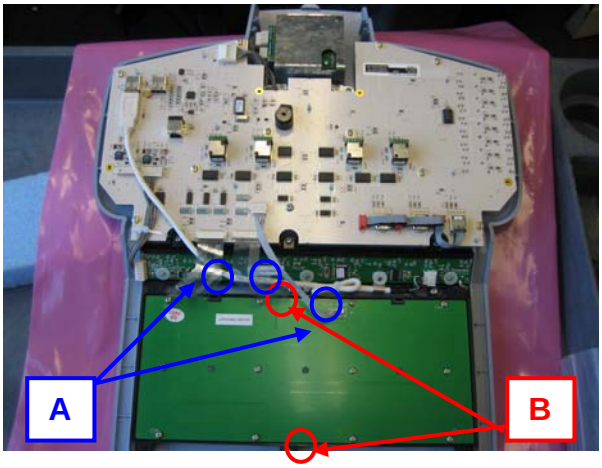
QWERTY Keyboard Removal/Replacement: (if changed separately)

STEPS:

1. Ensure the User Interface is removed per previous steps of User Interface Removal Procedure above.
2. Set the user interface (keys facing down) on a surface that will not damage the surface of the User Interface.
3. Disconnect the two (2) flex cables and single (1) LED driver cable from the QWERTY assembly (See Locations A).

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4. Remove the two (2) Phillips screws that retain the QWERTY assembly (See Location B).

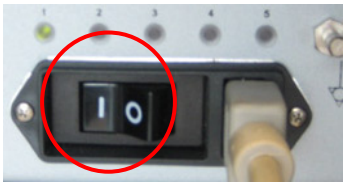


5. Pull the QWERTY straight up and remove.
6. Reinstall in the QWERTY in reverse order.
7. Reinstall the User Interface Assy in reverse order of the removal steps listed above and proceed to System Verification.

System Verification:

STEPS:

1. Reconnect the main AC power cord from the rear of the SmartCart or plug into the wall source.
2. Place AC circuit breaker, located at the rear of the SmartCart, in the "**1**" (ON) position.



3. Ensure the scan engine is docked in the SmartCart. LED 1 will blink quickly and LED 5 will remain on.
4. Energize the SmartCart
5. Attach a transducer (if not already connected)
6. Verify that the System is functioning correctly by performing a basic test. This test is comprised of the following:
    - Verify that the User Interface keys are functioning correctly by testing each of the keys.
    - Verify that the Softkey OLED displays are correct and functioning correctly based on the selected mode.
    - Verify the trackball functions correctly – testing both the horizontal and vertical axis.
7. Verification is complete – return system to normal operation.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

20.3.9 Main Board Assembly - Removal/Replacement (SmartCart)

IMPORTANT

*There are two different key revisions of Main Board (REV "**3F**" and REV "**3G**"). The two boards are **NOT** interchangeable!*

The two version boards are due to two different forms of CD/DVD drive connectivity in the SmartCart, depending upon the system's date-of-manufacture. The early drives attach to the rear of the Main Board via a parallel IDE cable. The DVD drives in the more recent systems (after April '09) use an IDE->USB adapter board, and attach via a USB cable connection at the front of the Main Board.

*- REV "**3F**": IDE (parallel) cabling method DVD drive*

*- REV "**3G**": USB (serial) cable connection method DVD drive*

Required Parts

- P/N: 85080-00 Assy, PCB Main Board, Gen II Cart
- Non-conductive (Kapton) tape
- Three strips of aluminum tape
- Small Cable Tie-wraps (Qty. 5)

Required Tools/Equipment

- #2 Phillips Screwdriver – Stubby
- #1 Phillips Screwdriver
- Flat Blade Screwdriver

Overview of Procedure

- Open Cosmetics (for chassis access)
- Remove Scan Engine Scanner Deck \ Left CEE (Cart Electronics Enclosure) Plastic Panel
- Remove / Replace Main Board
- System Verification

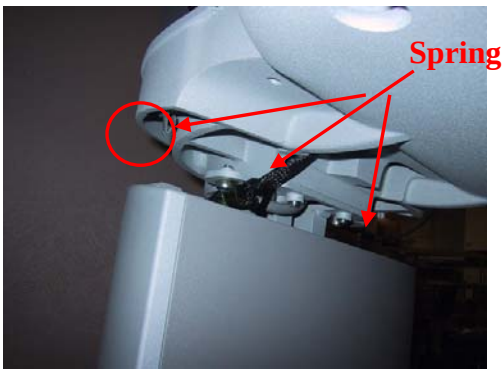
General Disassembly:

STEPS:

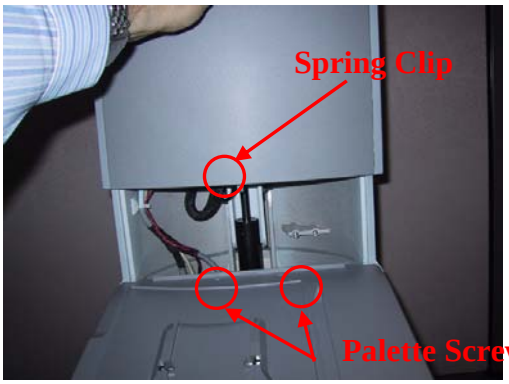
1. Ensure the Z.ONE*Ultra* is powered "OFF".
2. Place AC circuit breaker, located at the rear of the SmartCart, in the "**0**" (OFF) position.
3. Disconnect the main AC power cord from the rear of the SmartCart or unplug from the wall source.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4. Using the side of the hand – firmly knock the side of the chassis cosmetic sleeve loose. There are 3 spring clips that retain it at the top. If it does not come free – gently use the flat blade screwdriver to pry the cosmetics loose (use tape on the blade to avoid marring the chassis surface).



5. Slide the outer cosmetic chassis sleeve down and grab the inner sleeve front panel along with the outer sleeve at the same time from above.
6. Lift both the Inner and Outer sleeve to gain access to the Scanner Deck retention screws. There is one spring clip in the center which holds the inner panel down.

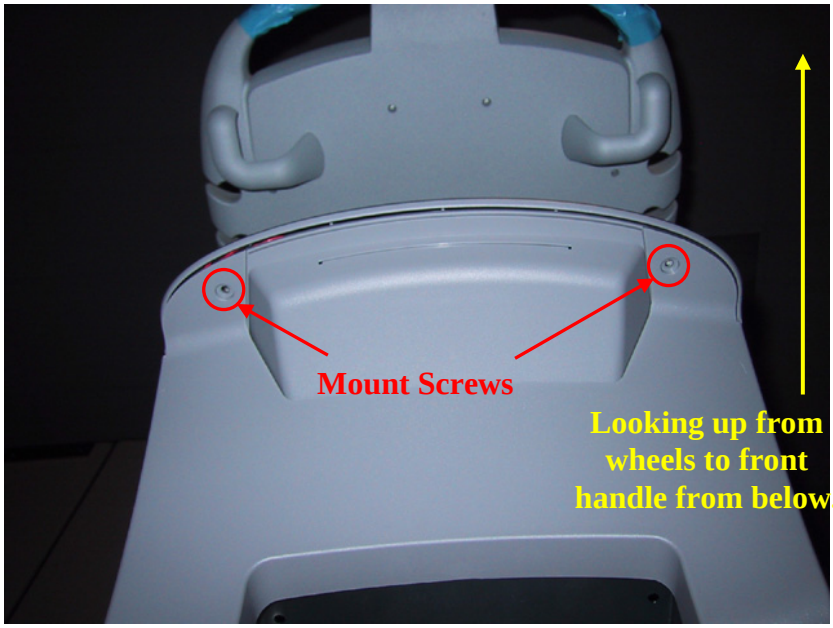


Removal of Scan Engine Scanner Deck:

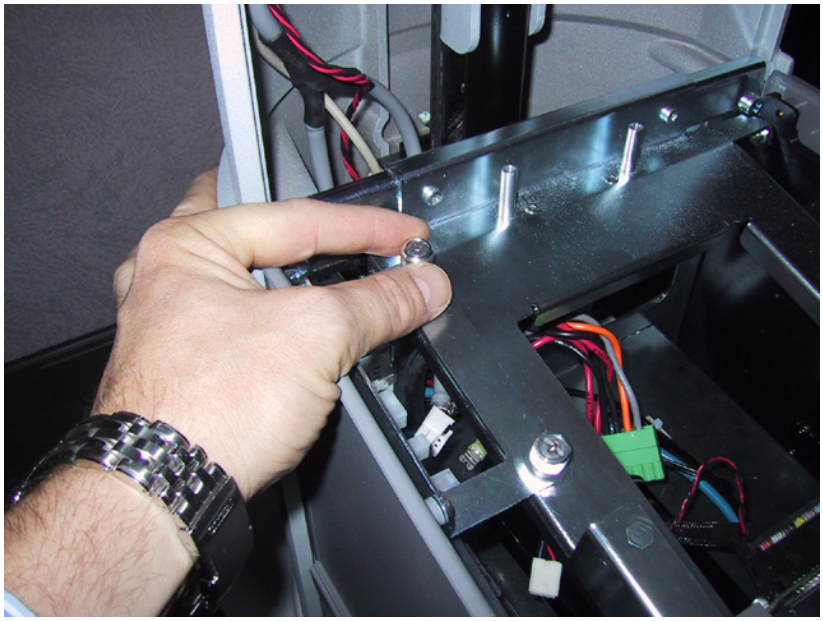
STEPS:

7. Remove the two (2) Phillips screws on top Scanner Deck.
8. Remove the two (2) Phillips screws on bottom front CEE cosmetics to the Scanner Deck.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



9. Partially lift the Scanner Deck off the Electronics Enclosure and move to the right side.
10. Remove the Left CEE Cosmetic panel by the Main Board – loosen the two thumbscrews (if present) and lift panel straight up to remove.



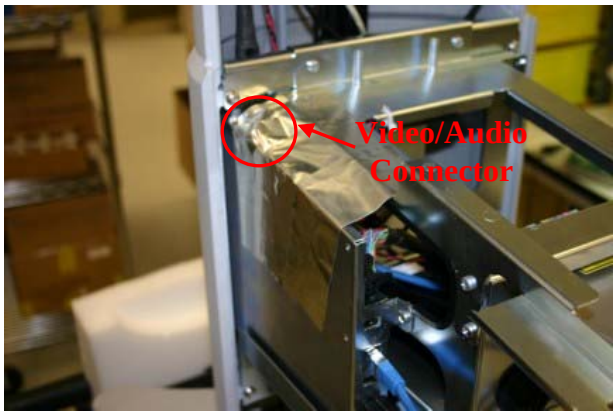
11. Disconnect the Scanner Deck wiring from the Main Board – taking note of the connector locations for reassembly. Cut any tie-wraps securing cables to the chassis.
12. Set the Scanner Deck aside.

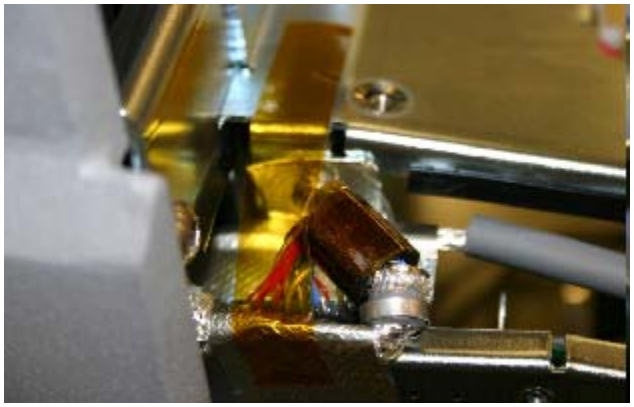
Removal of the Main Board:

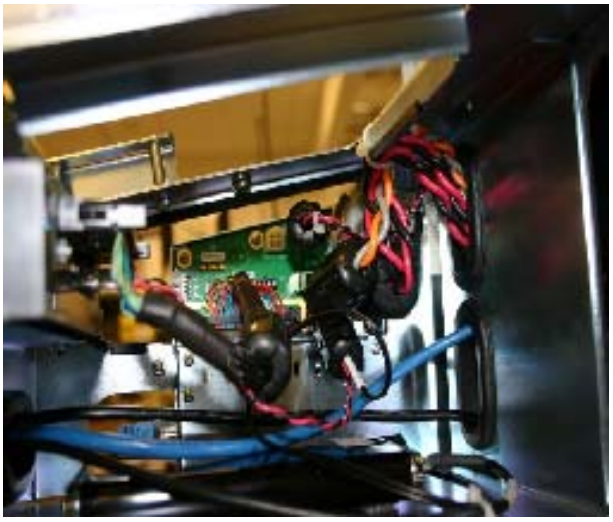
"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

STEPS:

13. Disconnect the cables attached to the Main Board – some may require the flat blade screwdriver to unlock the locking tab.

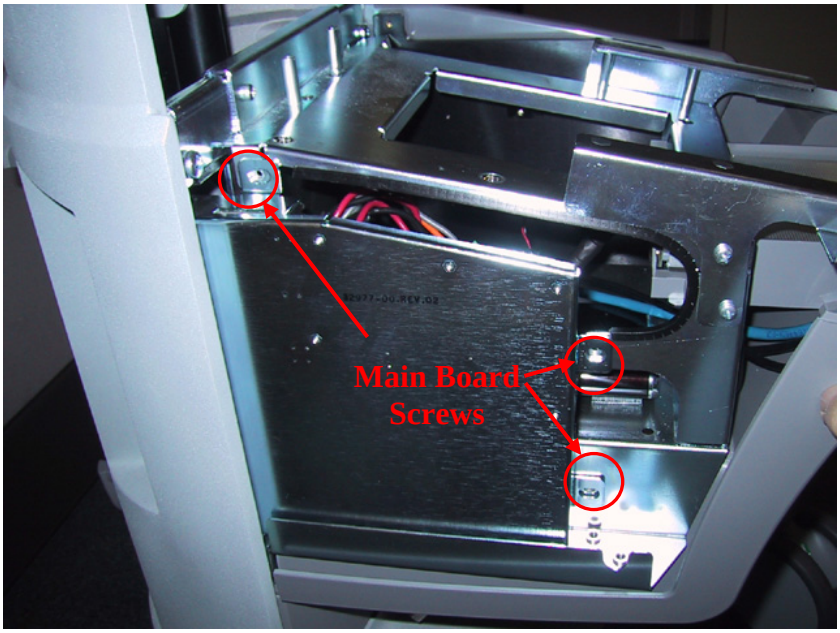




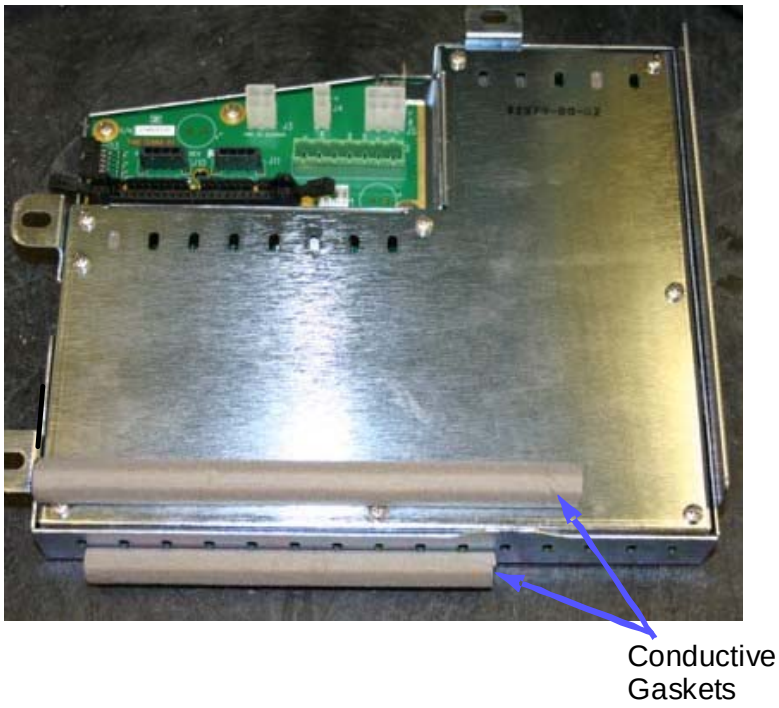


14. Once all the cables have been disconnected, ensure they are moved out of the way. Cut any tie-wraps that may have been retaining cables to the chassis.
15. Remove the three (3) Phillips head screws mounting the Main Board to the Cart Electronic Enclosure (CEE).

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



16. Slide the Main Board towards the front of the cart and remove from the chassis.
17. Ensure that conductive gasket strips (moved from old Main Board, if necessary) are installed in the locations as shown, on the outside surface of the metal case of the Main Board Assy.



18. Reinsert the new Main Board in the same fashion and secure the upper screw (near the Video/Audio connector jack). Ensure the rear of the Main Board sits flush with the exit on the Smart Cart chassis.
19. Reinsert and tighten the two remaining screws for the Main Board.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

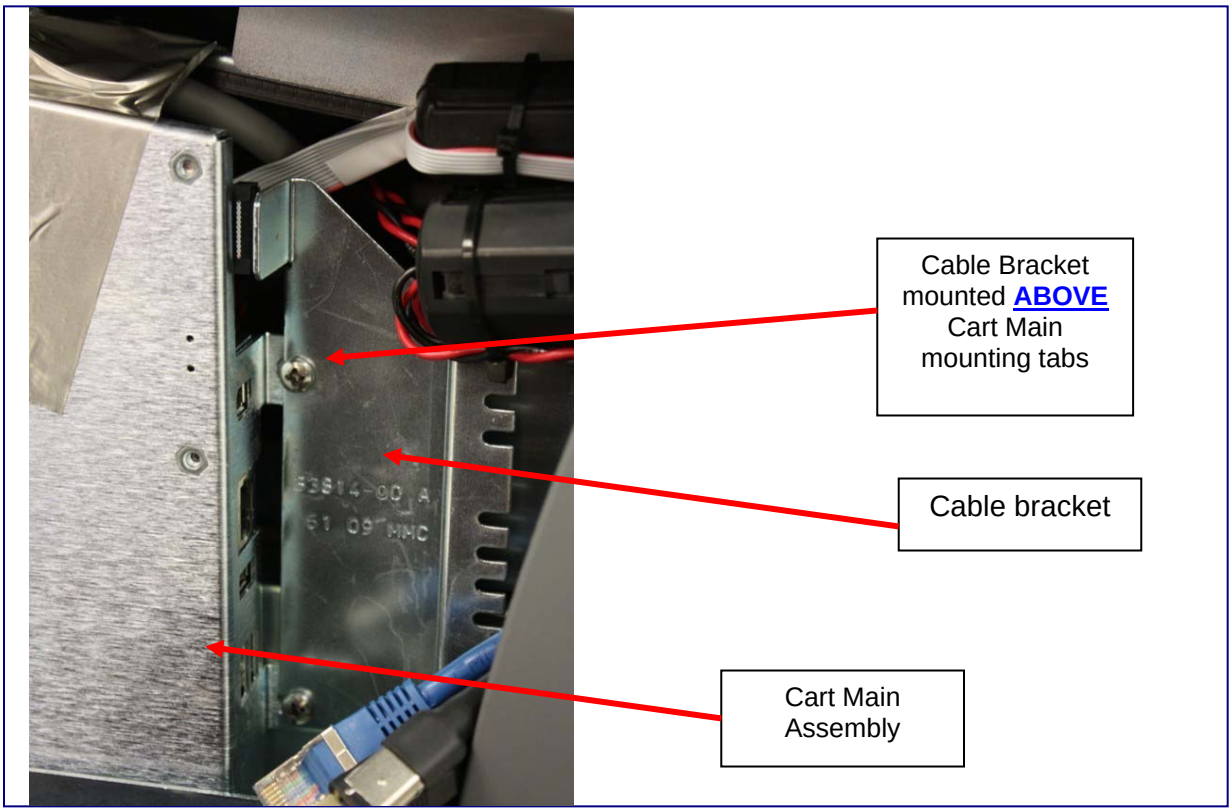
CAUTION

Multi-Cable Retaining Bracket - special info!

- **Multi-cable Retaining Bracket Installation Notes**:

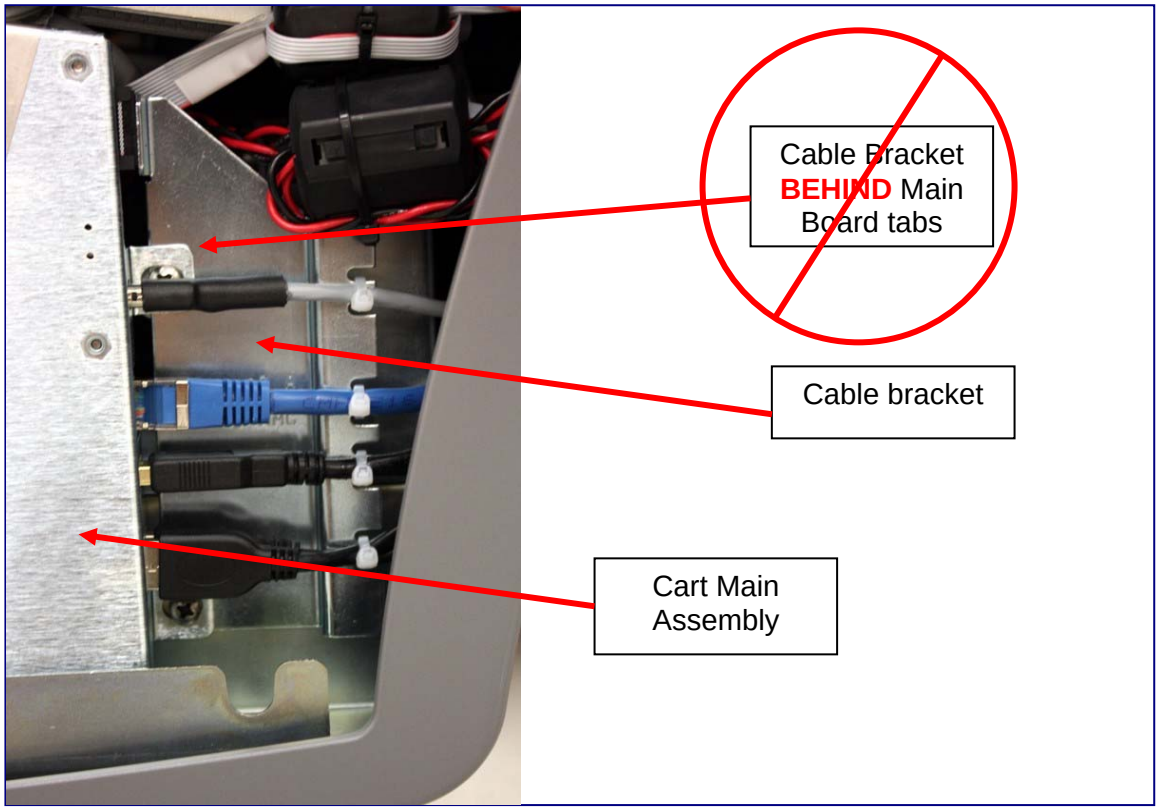
During final assembly it is important to install the metal multi-cable retaining bracket **OUTSIDE** the mounting tabs of the metal case of the Main Board; ***NOT*** underneath.

Note the images below showing the correct (ABOVE) and incorrect mounting (bracket is BEHIND the mounting tabs for the Main Board) examples.



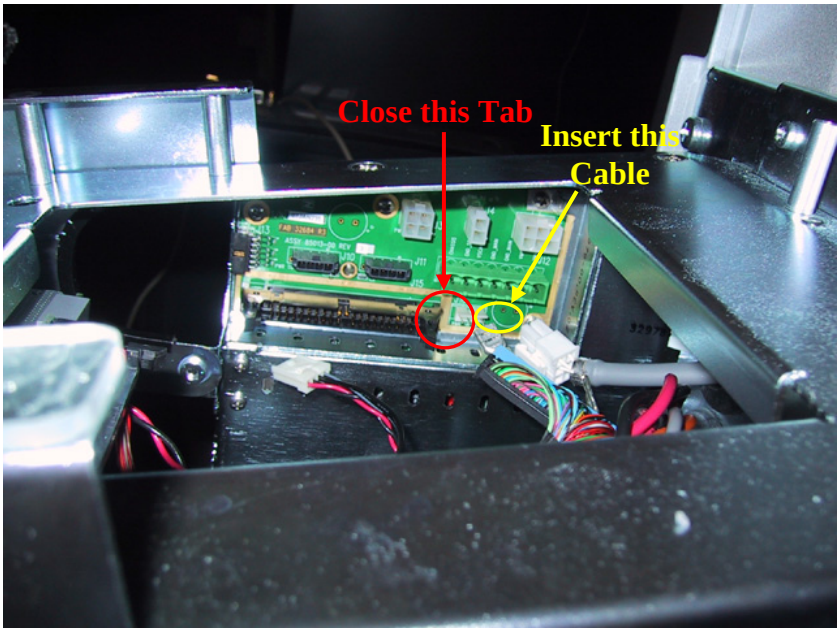
CORRECT placement of Retaining Bracket

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



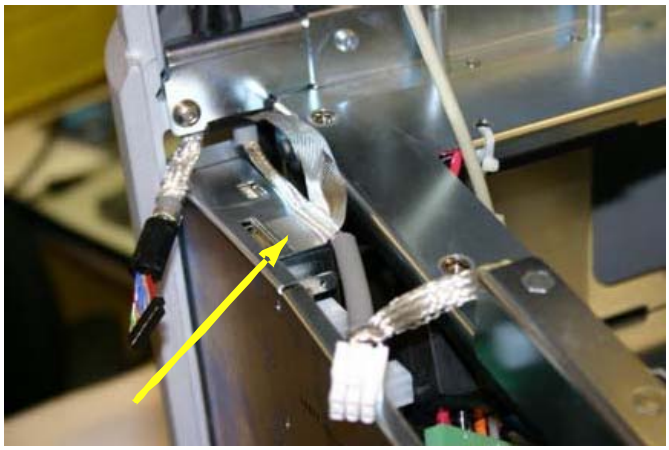
INCORRECT placement of cable Retaining Bracket

20. Reconnect the cables removed in Step 1 – figure below shows ribbon cable retaining tab position for adjacent cable installation. (Tab must be closed to get cable inserted)
21. Secure cables to the chassis with tie-wraps, in the same locations where they were originally removed.



"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

22. Apply tape to top of Cart Main Module, in location shown. Ensure front end of tape does not cover video connector opening. Continue pressing tape over the shield of the video power cable end, continuing up to the mounting flange of the Cart Main module.



23. Using sharp knife or scissors, cut slices in tape so that it can be wrapped around the mounting flange.
24. Reconnect the Display's power cable to the appropriate connector (J5) on the rear of the Main Board.
25. Reconnect the Video signal cable into **J1** connector on the Cart Main Module.

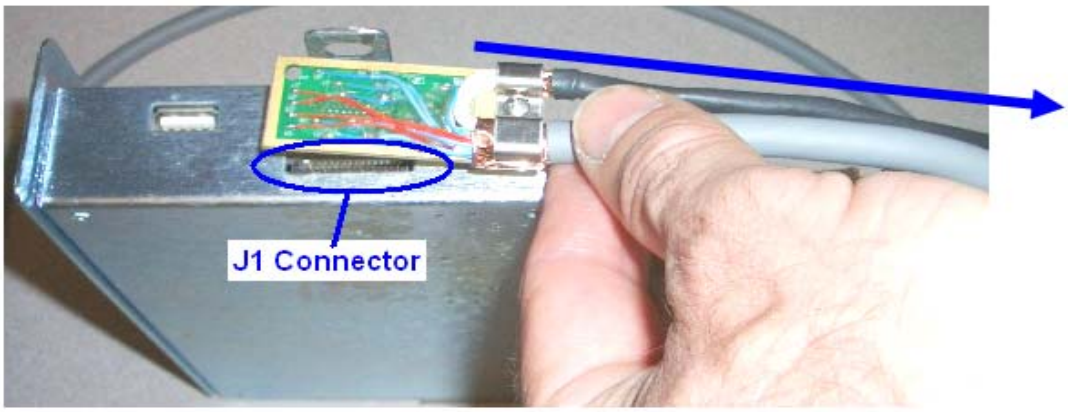
CAUTION

The J1 video connector on the Main Board is a VERY high-precision style connector, with very fine/fragile pins, and is surface-mounted to the PC board.

As such, extreme care MUST be observed to ensure proper alignment of the cable prior to pressing into place, and only light pressure should be required for fully seating cable in connector receptacle.

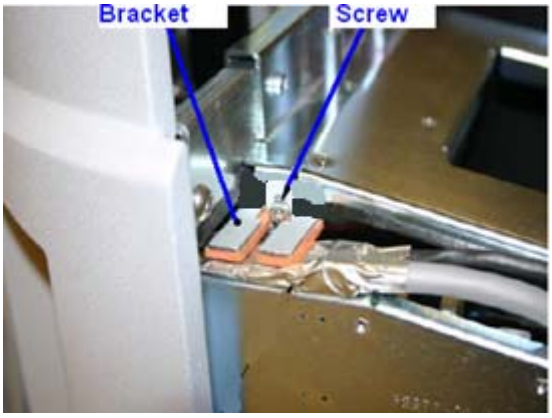
Failure to do so may result in permanent damage to the connector; requiring replacement of the entire Main Board assembly.

IMPORTANT: The direction of the main cable orientation at the time the connector on the cable is installed in the mating connector on the Main Board, is facing in the direction (towards the front of the system) as shown below:



"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

26. After paying note to "**Special Info**" information section below, install the Cable Retention L-Bracket in the location as shown. The bracket is secured using the upper mounting screw for the Main Board assembly

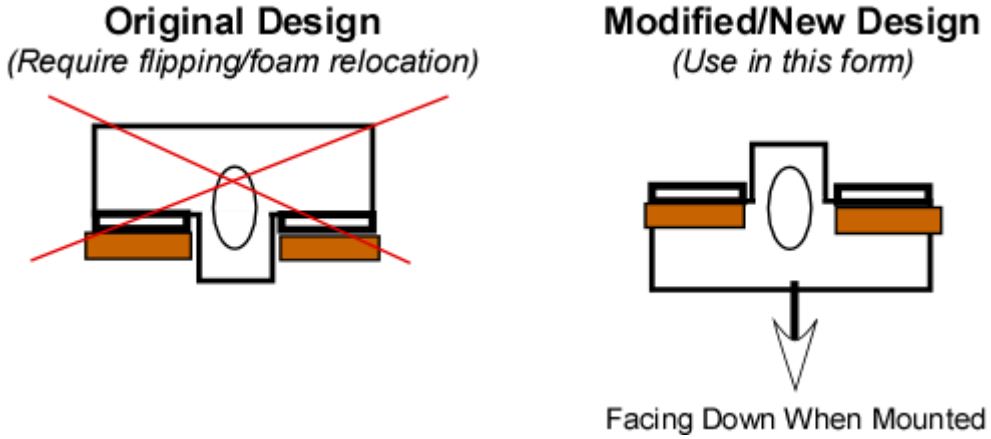


CAUTION

L-Bracket installation - special info!

- **<u>L-Bracket Cable Retention Clamp</u>**:

Due to findings that the rubber feet on the original designed retention clamp may exert excessive downward pressure on the J1 video connector below it (once the clamp is mounted) the following field retrofit during Main Board replacement is required on original design clamp types (as defined in the following illustrations).



IF the retention clamp is of the "Original Design" type (shown above), it will be necessary to perform the following modification steps to the clamp, prior to re-installing it:

1) Carefully peel the orange foam pads from the clamp (trying to retain the adhesive backing on the pads), and relocate them to the opposite side of the metal feet on the clamp (as shown in the "Modified" example above).

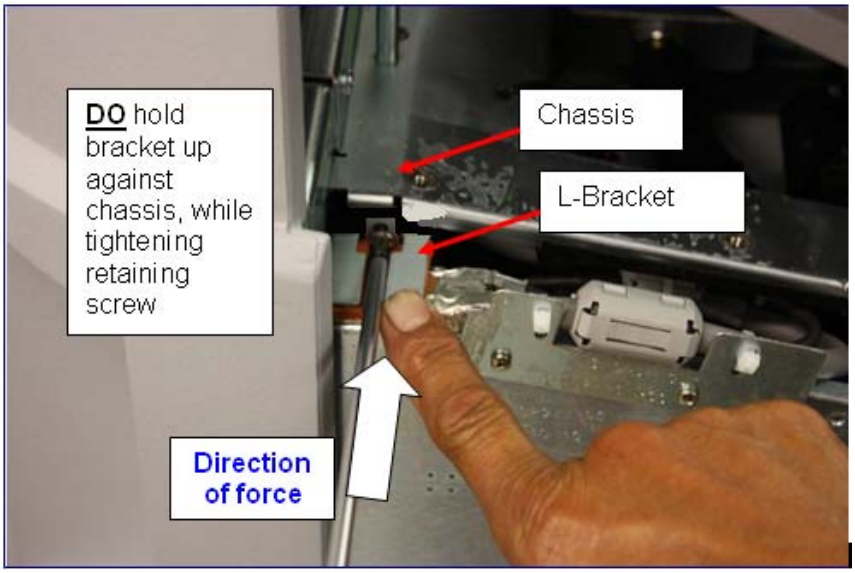
2) Mount the retention clamp in a reversed (from original mounting) orientation where the relocated foam pads are again facing DOWN, when the clamp is mounted to the chassis.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

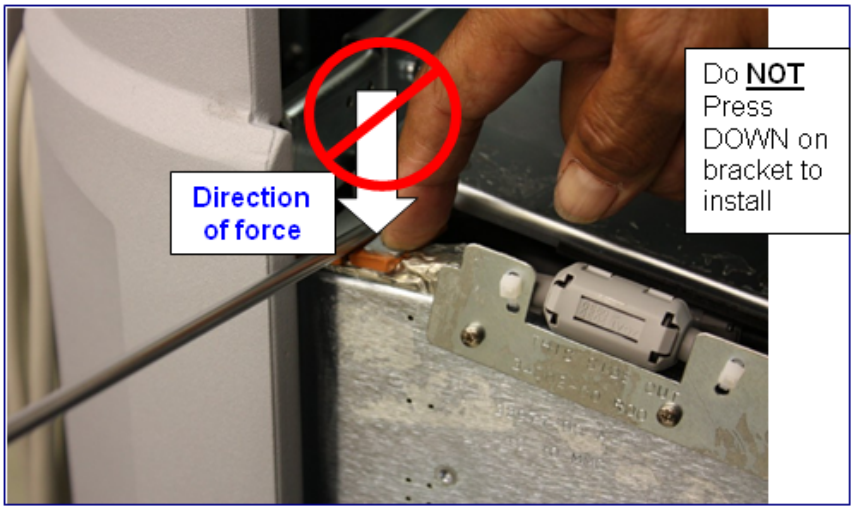
The intent of this bracket is to prevent the cable connector from coming dislodged. The only downward force required by this bracket is to LIGHTLY rest on top of the cable at the time it is secured in place by tightening the screw.

See Figures below for images of the RIGHT, and *WRONG* ways to potentially install the L-Bracket.

Figures: L-Bracket Installation



DO push inward on bracket against chassis



Do NOT Press DOWN on bracket during installation

NOTE 1: IF the previously installed Main Board in the Cart was of the type prior to the introduction of the metal Cable Restraint Bracket type, the grey plastic ferrite bead on the Video/Audio

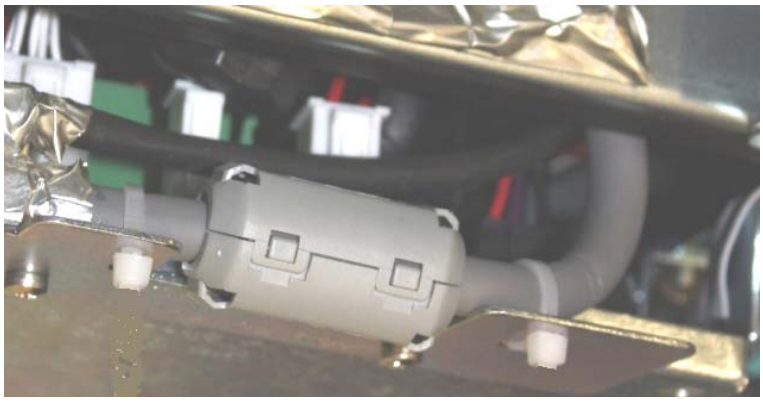
"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

cable may need to be slightly repositioned on the cable to ensure it aligns centered on the notched area on the bracket. (see Figure below)

NOTE 2: SmartCarts manufactured prior to Q4 2009, will likely not have a ferrite bead on the Video/Audio cable. The video cable should still be tie-wrapped to the Cable Restraint Bracket, for support.

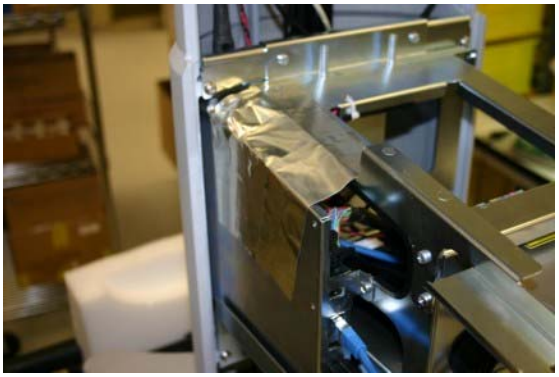
---

27. Install the two tie wraps through the two sets of holes in the Cable Restraint Bracket, wrapping around the Video/Audio cable, to secure the cable in place. Trim off the excess cable tie trip



28. Apply three strips of conductive adhesive backed tape to connect cover of Cart Main Module to the metal of the CEE Metal Framework. Note that each strip of tape is overlapping the previous strip

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

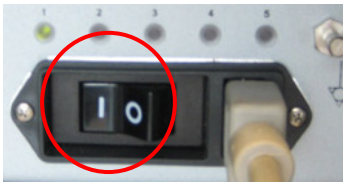


29. Reassemble the cosmetic panels in reverse order of removal and proceed to System Verification.

System Verification:

STEPS:

1. Reconnect the main AC power cord from the rear of the SmartCart or plug into the wall source.
2. Place AC circuit breaker, located at the rear of the SmartCart, in the "**1**" (ON) position.



3. Ensure the scan engine is docked in the SmartCart. LED 1 will blink quickly and LED 5 will remain on.
4. Energize the SmartCart
5. Attach a transducer (if not already connected)
6. Verify that the System is functioning correctly by performing a basic test. This test is comprised of the following:
    - Verify LCD display is functioning correctly by watching the boot and verifying that normal imaging is displayed after fully booted.
    - Verify Audio from the Display Assy – Enter PW, turn up the PW Gain and increase Volume
    - Verify that the User Interface keys are functioning correctly
    - Test USB ports on Main Board panel
    - Test and Verify Network Connectivity (if applicable)
    - Test and Verify USB Peripheral Connectivity and Functionality (if applicable)
7. Verification is complete – return system to normal operation.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

20.3.10 MTP Bolster Plate w/CW Module Assembly - Removal/Replacement (SmartCart)

Required Parts

- P/N: 86121-00 Assy, MTP/CW Module

Required Tools/Equipment

- #2 Phillips Screwdriver – Stubby
- #1 Phillips Screwdriver
- Wire cutters
- Long handled flat-blade screwdriver (3mm width blade, 12” shaft, thin blade)
- 9/32” Nut Driver or wrench
- 5mm Nut Driver, or wrench
- #1 Phillips Screwdriver

Prerequisite Procedures to Be Performed:

- Scanner Deck Procedure (Loosen by screw removal only)

Overview of Procedure

- Open Cosmetics (for chassis access)
- Loosen Scanner Deck Assembly
- Remove / Replace MTP/CW Module
- Re-install Removed Assemblies
- System Verification

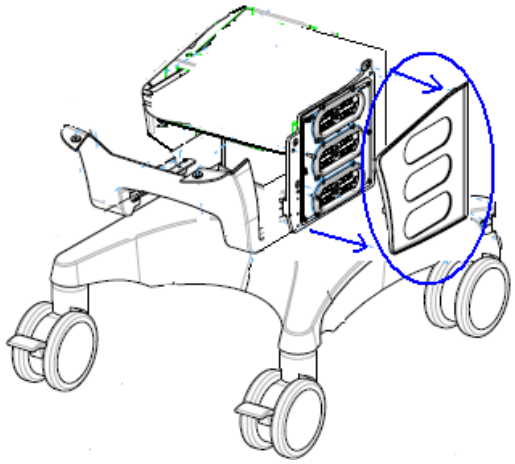
MTP/CW Module Access/Removal-Replacement:

STEPS:

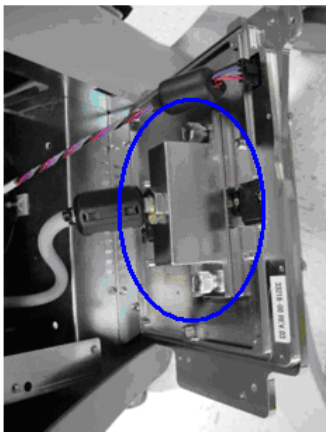
1. Remove the two (2) Phillips head screws securing the right side of the lower cosmetic cover. The screws are located on the right side next to the printer mounting bay

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

2. With the right side lower cosmetic cover loosened, grasp the gray plastic Right CEE cosmetic panel (that surrounds the mock transducer storage ports) and remove it

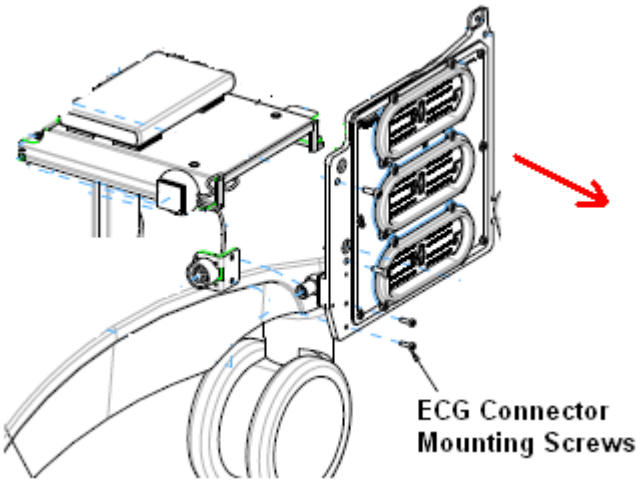


3. Remove the three (3) Phillips screws securing the MTP Bolster Plate to the cart
4. Disconnect the Power and ECG Module attachment cables at the rear of the MTP/CW Module
5. Disconnect the MTP dongle cable from the rear of the MTP/CW Module



6. Remove the two ECG bulkhead connector mounting screws from the MTP/CW Module, and then remove MTP/CW module from the system

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



7. Reverse all previous disassembly steps for completing installation

System Verification:

STEPS:

1. Reconnect the main AC power cord from the rear of the SmartCart or plug into the wall source.
2. Place AC circuit breaker, located at the rear of the SmartCart, in the "**1**" (ON) position.
3. Attach a CW transducer and standard transducers to each of the MTP ports and verify full system operation in all modes
4. Verification is complete – return system to normal operation.

20.3.11 ECG Module Assembly - Removal/Replacement (SmartCart)

Required Parts

- P/N: 85804-00 Assy, ECG Module – Service FRU

Required Tools/Equipment

- #2 Phillips Screwdriver – Stubby
- #1 Phillips Screwdriver
- Flatblade Screwdriver
- Wire cutters

Overview of Procedure

- Open Cosmetics (for chassis access)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- Loosen Scanner Deck Assembly (for access)
- Remove MTP w/CW Bolster Plate Assembly
- Remove / Replace ECG Module
- Re-install Removed Assemblies
- System Verification

Scanner Deck Loosening:

STEPS:

1. To gain access, perform mounting screw removal portion (ONLY) of the Scanner Deck Removal Procedure (included elsewhere in this “Repair Procedures” section of the manual).

MTP w/CW Bolster Plate Assembly Removal:

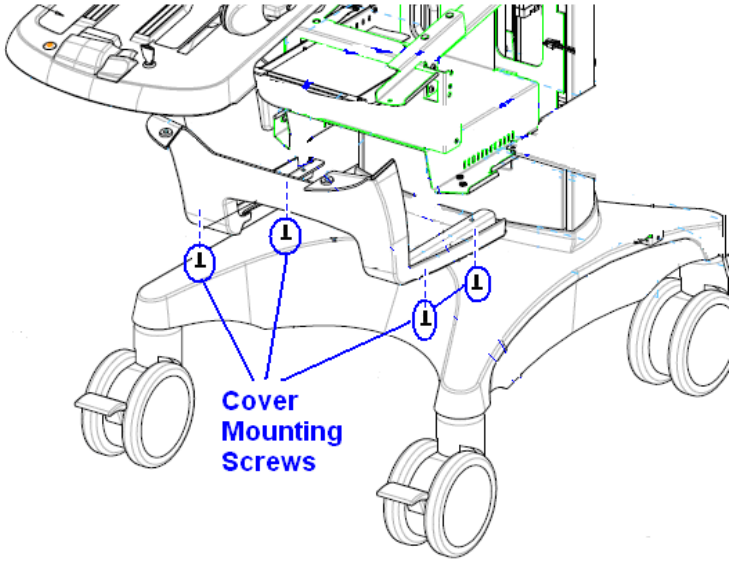
STEPS:

1. To gain access, perform the MTP w/CW Bolster Plate Removal Procedure (included elsewhere in this “Repair Procedures” section of the manual).

ECG Module Access/Removal-Replacement:

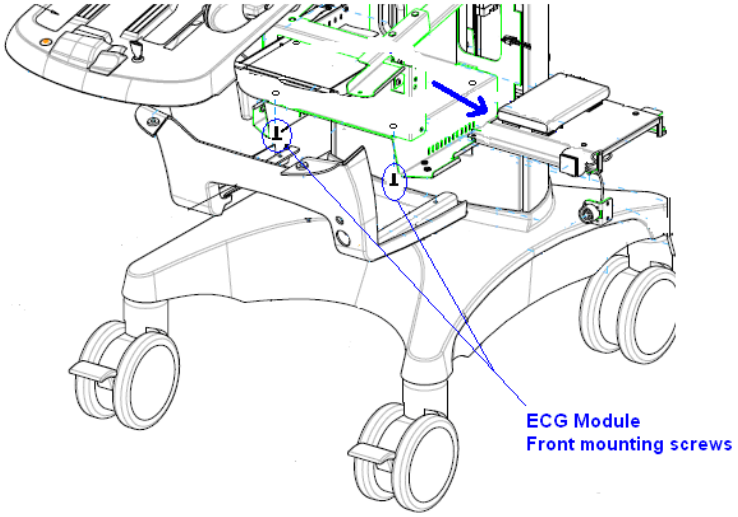
STEPS:

1. From the bottom, on either side of the printer mounting bay, remove the four (4) Phillips head screws securing the gray plastic cosmetic Front Cover

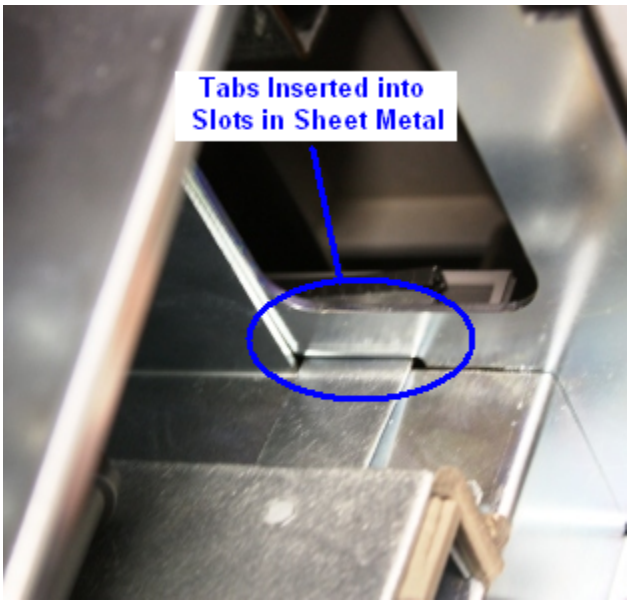


2. Remove the two (2) Phillips head screws, in the front mounting holes, that secure the ECG Module to the sheet metal of the chassis

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

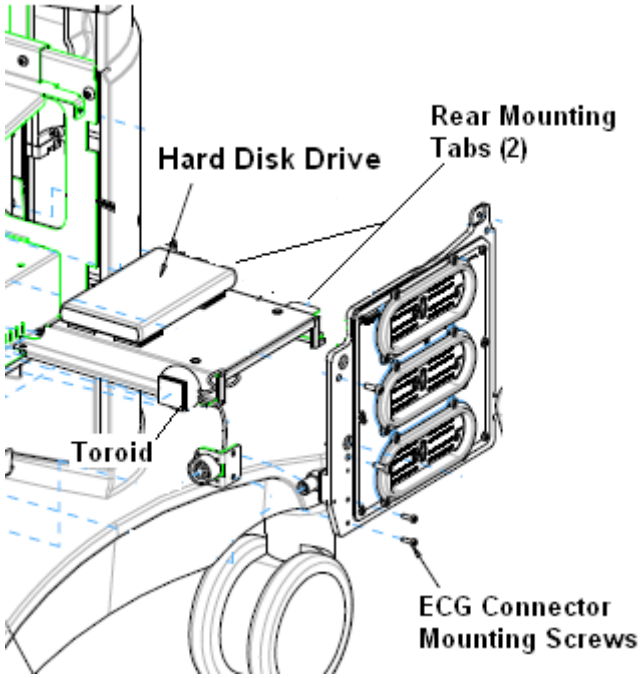


3. Disconnect the power and data cables attached to the HDD (Hard Disk Drive)
4. Slide the ECG Module forward far enough for the two metal tabs at the rear of the ECG Module to clear the corresponding slots in the sheet metal of the chassis



5. At the ECG Module, disconnect the connectors for the cable going to the ECG bulkhead connector and the cable that attaches to the CW Module
6. Rotate the ECG Module 45 degrees to clear the sheet metal of the chassis, and then remove the assembly from the system
7. Detach the HDD from the dual-lock tape that is securing it to the sheet metal of the old ECG Module, and remove the HDD.
8. Using dual-lock tape, mount the HDD to the top surface of the sheet metal cover of the replacement ECG Module (located offset to the left side as shown below, for cable length requirements in the system).

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



9. Position the ECG Module back into the chassis of the system, but do not mount until after reconnecting cables (as listed in following step).
10. Reconnect the main ECG cable (with toroid and bulkhead connector) and the ECG/CW Module interface cable, to the ECG Module
11. Reverse all previous disassembly steps for completing installation
12. Attach ECG leads to bulkhead connector, and verify normal ECG operation on system

---

20.3.12 Gas spring - Removal/Replacement (SmartCart)

Required Parts

- P/N: 33073-00 Assy, Gas Spring, Gen II Cart

Required Tools/Equipment

- #2 Phillips Screwdriver
- 5mm Allen Hex wrench
- 13mm socket, used on a ratcheting wrench
- 9/32” Nut Driver or wrench

Prerequisite Procedures to Be Performed:

- Main Power Supply Module - Removal

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Overview of Procedure

- Removal of gas spring
- Re-installation of above items
- Verification of system operation

Main Power Supply Removal:

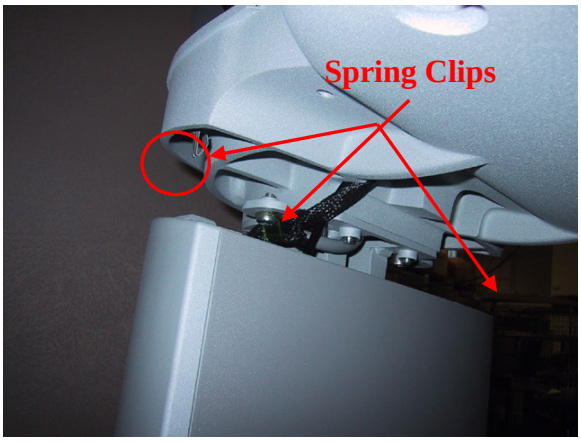
- Perform Main Power Supply Module Removal

  (NOTE: Refer to Main Power Supply Replacement Procedure in this manual)

Gas Spring Removal:

STEPS:

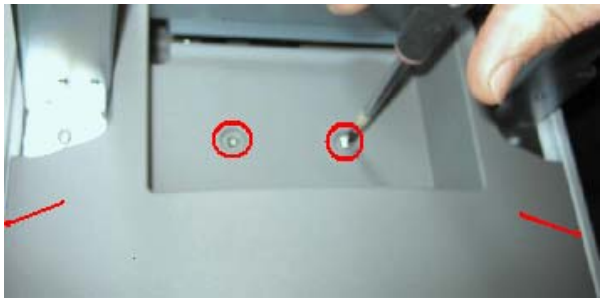
1. Using the side of the hand – firmly knock the side of the plastic cosmetic sleeve loose. There are 3 spring clips that retain it at the top. If it does not come free – gently use the flat blade screwdriver to pry the cosmetics loose (use tape on the blade to avoid marring the chassis surface).



2. Slide the plastic cosmetic sleeve downward as far as it will go, letting it slide over the bottom panel insert.

3. Pull the lift release lever and position the User Interface lift to its LOWEST position.
4. Remove the two Phillips-head screws that retain the lower access cover panel.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"



5. Remove the lower access panel cover by pulling inward on the edges to allow the ridges to clear the frame, and then removing panel.
6. In combination of accessing from the top and through the access holes in the bottom of the SmartCart chassis, using the 5mm hex Allen wrench and 13mm socket, remove the lower mounting hardware (bolt, nut and 2 spacers) that attaches the gas stock to the base bracket.

7. Grasp the handles on the User Interface housing, and slide (lift) the upper portion of the SmartCart to its most fully extended position to expose (above the top edge of the plastic cosmetic sleeve) the top mounting point for the gas spring.

   ***NOTE**: DO NOT pull the lift release handle while sliding (lifting) the User Interface housing upward, as the bottom gas spring point is currently disconnected, and should raise free of its mounting)*

   Raising the User Interface to this position should also allow the bottom of the gas spring to raise clear (outside) of the attachment bracket.

8. At the top of the gas spring, disconnect the release cable from the actuating mechanism, by first lifting the barrel adjuster out of the mounting slot, and then removing the cable end from its recess in the actuating lever.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

9. Remove the upper mounting hardware (bolt, nut and 2 spacers) that attaches the gas stock to the frame of the SmartCart.
10. Lift the top portion of the gas spring upward as far as possible, out of the recess channel, and then shift its position to the left as far as possible. The goal being to angle the gas spring for removal via the exit hole on the right-hand hole at the bottom of the base assembly of the SmartCart.
11. Reaching through the power supply module cavity in the SmartCart, extract the gas spring downward and out through the right-hand access hole.

Gas spring & Power Supply Module Re-Installation:

STEPS:

1. Reverse all of the previous steps for installing the replacement gas spring, and re-installing the power supply module.

System Verification:

STEPS:

1. Reconnect the main AC power cord from the rear of the SmartCart or plug into the wall source.
2. Place AC circuit breaker, located at the rear of the SmartCart, in the "**1**" (ON) position.
3. Operate the lift mechanism through its full range to ensure proper gas spring operation.
4. Power on the SmartCart and perform a series of basic user operations, to verify normal system functionality.
5. Verification is complete – return system to normal operation.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

20.3.13 DVD/CD Drive Replacement (SmartCart)

Required Parts

- P/N 86784-00 Assy, DVD/CD Drive w/Adapter Cable
- Small ty-wraps (3)

Required Tools/Equipment

- #2 Phillips Screwdriver – Stubby
- T10 Torx Screwdriver
- Small flat blade screwdriver

Prerequisite Procedures to Be Performed:

- Scanner Deck Removal

Overview of Procedure

- *Remove Scanner Deck (reference procedure elsewhere in this chapter)*
- Remove and replace DVD Drive
- System Verification

IMPORTANT

Historically there have been two different methods of connectivity of the CD/DVD drive to the Main Board in the SmartCart.

1) ***Original*** *generation of SmartCarts (**S/N 3XXX**) attached via a parallel IDE cable connection. This type of DVD drive requires a REV "**3F**" Main Board.*

2) *Newer SmartCarts (**S/N 4XXX**) use a USB type cable connection. This type of DVD drive requires a REV "**3G**" (or newer) Main Board.*

DVD Drive Replacement:

STEPS:

1. Disconnect the cable connections for the DVD Drive.
2. Remove the two (2) Torx screws that secure the gray plastic upper-mount brace that retains the DVD drive to the chassis

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

3. Slide the DVD drive out from under the under the metal framework of the CEE chassis, and remove the drive from the system.
4. Position the replacement DVD drive into its mounting position in the chassis.
5. Secure the DVD drive in place by reinstalling the upper-mount brace, using the two (2) Torx screws.

CAUTION

DO NOT *over-tighten these two screws, as it may result in putting excessive downforce on the top/front of the DVD drive and cause the DVD media to not properly load into the drive.*

6. Reconnect the DVD interface and DC power cables.
7. Reverse removal steps for installing replacement Scanner Deck. Note: cables need to be secured to chassis using ty-wraps, upon re-assembly

IMPORTANT NOTE!

ONLY the following two types of media can be used in the DVD drive on the Z.ONEUltra:

- DVD: DVD "**+R**" or "**+RW**" Type (Not - type)
- CD: CD "**-R**" Type (Not + type)

System Verification:

STEPS:

1. Reconnect the main AC power cord from the rear of the SmartCart or plug into the wall source.
2. Place AC circuit breaker, located at the rear of the SmartCart, in the "**1**" (ON) position.
3. Dock the scan engine on the SmartCart, and ensure it latches securely.
4. Press the power button on the Scanner Deck to energize the SmartCart, and allow it to fully boot.
5. Attach a transducer (if not already connected), and ensure basic imaging operation.
6. Insert a blank DVD or CD (***type*** as discussed in Note at top of this section) disk (label facing up) into the drive. After 3-4 seconds a green disk icon will appear on the top left corner of the cart display.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

7. Go to system archive and export study to the CD. Upon completion, the disk will automatically be ejected.
8. Verification is complete – return system to normal operation.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

20.4 Hardware Service/Replacement Procedures (*mini*Cart)

20.4.1 Main AC Power Fuse Removal/Replacement (*mini*Cart)

Required Parts

- P/N: 32618-00 .....FUSE, 6.3A, SLO-BLOW, 5mmx20mm (100-120V Systems)
- P/N: 32627-00 .....FUSE, 3.15A, SLO-BLOW, 5mmx20mm (200-240V Systems)

Required Tools/Equipment

- Small, flat-blade screwdriver

Procedure

STEPS:

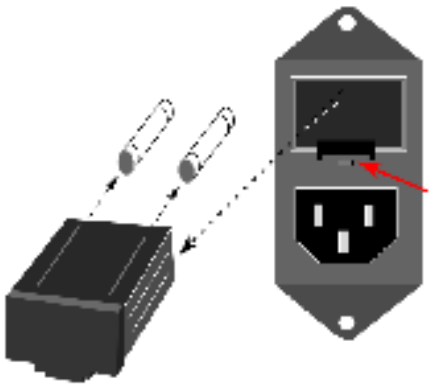
1. Power off the Scan Engine.

2. Completely disconnect the main AC power cord from the rear of the *mini*Cart, to ensure no AC power is being applied to the system.

3. The fuse holder is located directly above the connector (at the lower-left, rear of the *mini*Cart) where the main AC power cord plugs into the back of the *mini*Cart.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4. Using a small screwdriver (or the edge of a fingernail, if applicable), lift up on the plastic release tab (shown by the arrow below), in the slot at the bottom-center of the fuse holder's cover plate.



5. Slide the fuse holder assembly out of its receptacle.
6. Remove both fuses from the fuse holder, and inspect.
7. Replace fuses as required, and reverse above steps for re-installation.

Fuse Specifications: - 100-120V Systems: **T6.3A/250V**
- 200-240V Systems: **T3.15A/250V**

20.4.2 Main Power Supply – Removal/Replacement (*mini*Cart)

Required Parts

- P/N: 32621-00 .....Power Supply , 250W, 5V@8A, 12V@6A, 12V@20A, Med. Grade

Required Tools/Equipment

- #2 Philips head screwdriver
- Flat-blade screwdriver

Procedure

STEPS:

1. Ensure the Z.ONE*Ultra* is powered "OFF"
2. Disconnect the main AC power cord from the rear of the *mini*Cart
3. Un-dock the Scan Engine from the *mini*Cart, and set it aside
4. Carefully lower the *mini*Cart over on its back, on a soft surface (carpet, etc) resting the unit on the rear push handle
5. Using a Philips-head screwdriver, remove the four (4) screws (two on each side of the chassis) that retain the power supply cover, to the *mini*Cart chassis

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

CAUTION

Be sure to support the power supply assembly when removing it, as all of the cables will still be attached.

6. Allow the power supply housing to drop downwards, and rotate it to expose the internal components

7. Mark the location of all of the wires attached to the terminal strips on the main power supply
8. Disconnect all wires from their attachment points on the terminal strips
9. Remove the M6 nut on the grounding stud, and remove wires.
10. Remove the four M4 x 6 Phillips-head screws that retain the power supply to the mounting plate.
11. Remove the power supply from the *mini*Cart
12. Reverse previous steps for installation of the replacement power supply

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

20.4.3 USB Hub Service – Removal/Replacement (*mini*Cart)

Required Parts

- P/N: 32640-00 .....USB Hub, high speed

Required Tools/Equipment

- 10mm, nut driver
- Flat-blade screwdriver (thin blade)

Procedure

STEPS:

1. Ensure the Z.ONE*Ultra* is powered "OFF"
2. Disconnect the main AC power cord from the rear of the *mini*Cart
3. Remove the four (4) 10mm nuts that secure the USB hub cover to the *mini*Cart chassis

4. To loosen the hub cover from the threaded studs, use a thin tipped, flat-blade screwdriver, to wedge between the cover and the frame of the *mini*Cart

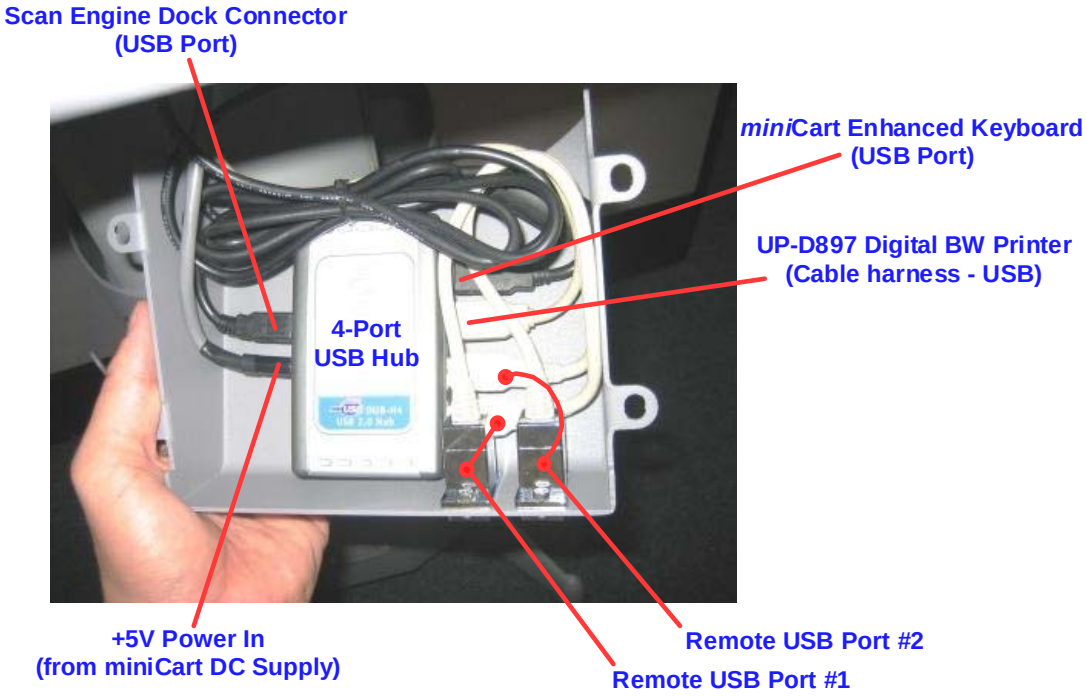
5. Slide the hub cover straight downwards, until it is free from the mounting studs

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

CAUTION

Be sure to support the hub assembly when removing it, as all of the cables will still be attached.

6. Allow the hub cover to swing downwards, to expose the hub and cables



7. For hub replacement, disconnect the five (5) USB cables and the +5V power cable
8. Pull the USB Hub from its sticky-strip attachment, to the bottom surface of the cover
9. Reverse previous steps for re-installation

20.4.4 Remote Keyboard Assy - Removal/Replacement (*mini*Cart)

Required Parts

- P/N: 32647-00 ..... Assy, Remote Keyboard (*mini*Cart)

Required Tools/Equipment

- 10mm Nut Driver
- Needle-Nose Pliers
- Flat-blade screwdriver
- Diagonal Cutters or Knife
- Dual Lock Fastener Tape

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

- Cable Ties

Overview of Procedure

- Removal of USB Hub Cover
- Removal of Remote Keyboard Assembly

Removal of USB Hub Cover:

STEPS:

1. Ensure the Z.ONE*Ultra* is powered "OFF"
2. Disconnect the main AC power cord from the rear of the *mini*Cart.
3. Remove the four (4) 10mm nuts retaining the USB Cover and drop the cover so that the USB Hub is accessible.

***NOTE**: This may require using a flat-blade screwdriver to initially pry the cover free from the threaded studs.*

4. Disconnect the USB connector (at the Hub) for the cable leading from the Remote Keyboard to the USB Hub.

5. Slide the keyboard tray out, to gain access to the Remote Keyboard, and then detach it from the Dual-Lock fastener tape that secures it to the top surface of the sliding tray.

***NOTE**: The Dual Lock fastener tape is quite strong, and will require a firm pull to remove the keyboard. Be careful to not damage the keyboard or tray when separating.*

6. Ensure the new keyboard has Dual Lock Fastener Tape in the appropriate area prior to installation.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

7. Reverse the procedures for installation of the keyboard and other components removed during this procedure,

***NOTE**: Ensure that you use appropriate cable ties to secure cables in their respective places and firmly secure the new keyboard to the keyboard tray's Dual Lock without damaging the new keyboard.*

20.4.5 LCD Display - Removal/Replacement (*mini*Cart)

Required Parts

- P/N: 32629-00 ..... Assy, LCD Display (*mini*Cart)

Required Tools/Equipment

- T10 Torx screwdriver
- 2.5mm, Allen / Ball Wrench
- Small flat-blade screwdriver
- Foam Pad (approx 12" x 12")

Removal of the 13" LCD Display (*mini*Cart):

STEPS:

1. Ensure the Z.ONE*Ultra* is powered "OFF"
2. Disconnect the main AC power cord from the rear of the *mini*Cart
3. Remove the T10 Torx screws securing each of the two plastic half-shell cosmetic covers, at the back of the LCD Display.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4. To remove each of the two plastic half-shell covers, place the head of a screwdriver just into the empty screw hole, and carefully pry upward/outward. This is being done to raise the cover sufficiently for the plastic locking tab (at the outside edge of the cover) to clear the lip on the main display housing. Once each cover is free, remove it from the back of the LCD display.

5. Disconnect the two cables (+12V Power, DVI-Video), at their attachment points on the back of the LCD Display. The DVI cable requires loosening of the two slotted-type retaining screws, prior to cable removal.

6. Remove the four (4) 2.5mm Allen / hex-head screws that retain the LCD Display to the metal hinge assembly, ensuring to support the LCD Display while removing the last screw.

CAUTION

Be sure to support the display to prevent damage during removal or installation.

***NOTE**: If supporting the LCD Display while removing the screws is difficult, a small box or like object of appropriate height in conjunction with foam padding may be used to support the monitor during removal and installation (as shown below).*

7. Remove the old LCD Display.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

8. Acquire the replacement display and hold it in position on the protective pad (aligning the threaded screw holes with the mounting holes in the metal hinge plate).
9. Initially start each of the four (4) mounting screws, and then fully tighten once all screws are in place.
10. Reverse the previous disassembly procedure steps, for completing the installation of the new LCD display.

20.4.6 Casters/*Wheels* - Removal/Replacement (*mini*Cart)

Required Parts

- P/N: 32737-00 ..... Assy, Caster, Front (w/Brake)
- P/N: 32738-00 ..... Assy, Caster, Rear (w-o/Brake)

Required Tools/Equipment

- 19mm open-end wrench (thin head)
- LocTite 242 (blue) thread locking compound

Removal of the Caster:

STEPS:

1. Ensure the Z.ONE*Ultra* is powered "OFF"
2. Disconnect the main AC power cord from the rear of the *mini*Cart.
3. Fold the LCD display screen down to a horizontal position, for protection from moving during tilting of *mini*Cart.
4. Ensure the Swivel Lock is in the "Locked" position.
5. Lock the brake mechanism on each front wheel to keep the *mini*Cart from rolling.
6. On a soft surface (carpet, etc.) tilt the Cart backward, until it is horizontal, resting on the rear push handle for support.
7. Using the 19mm wrench, loosen the threaded stud that connects the Caster to the base of the *mini*Cart.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

8. Reverse the disassembly procedure, for installing the new Caster.

***NOTE**: Applying LocTite 242 thread locking compound to the threads of the Caster mounting stud is recommended*

9. Tilt the *mini*Cart back up onto its wheels, and release the brake mechanism.
10. Verify smooth operation and pivoting of the Cart during all directional movements.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

20.5 Hardware Service/Replacement Procedures (Scan Engine)

20.5.1 Rear I/O Door Assembly - Removal/Replacement (Scan Engine)

Required Parts

- P/N: 80255-00 .....Rear I/O Door Assembly (Zonare)

Required Tools

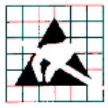
- ESD protection equipment (wrist grounding strap, anti-static surface)
- #2 Philips-head screwdriver

Procedure

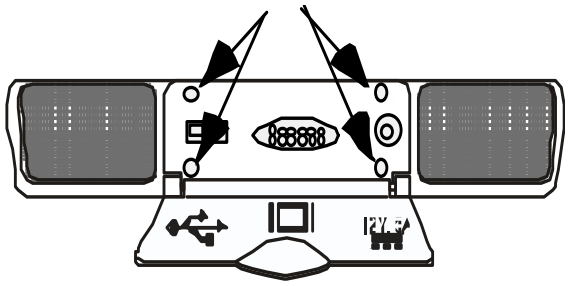
STEPS:

1. Ensure the Z.ONE*Ultra* is powered "OFF"
2. Remove the Scan Engine from the Cart (if currently docked)
3. Lay Scan Engine face-down
4. Remove battery pack from the Scan Engine

CAUTION



To prevent potential static shock damage to sensitive electrical components in the Scan Engine, use of all proper ESD (Electro Static Discharge) protection (wearing grounded wrist strap) and avoid direct contact with electronics during replacement of the Rear I/O Access door.



5. Completely loosen the four (4) Philips-head screws, retaining the door to the Scan Engine
6. Grasping the hinged door, lift the door assembly out of the Scan Engine
7. Reverse above procedure for reinstallation, ensuring that the rubber boot (located inside the doorway) is properly positioned prior to door installation

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

20.6 Hardware Service/Replacement Procedures (Transducers)

20.6.1 Transducer TCON/MUX Board - Removal/Replacement

Required Parts

- P/N: (as required per transducer type): ..... TCON Board – Pre-programmed

Different TCON board types (part numbers) exist for the full range of Zonare transducers. Below is a table specifying TCON board part numbers applicable for each transducer type.

NOTE: Be aware that there are "***Pogo-Pin***" (new) style and standard-style pin (old) part numbers TCON boards for some transducer applications.

NON- POGO-PIN Style:

Part Number	**80173**	**85001-00**	**80123**	**84020**	**85011-00** *(192 Ch.)*	**85096-00**	**80026**
Probe Types (where used)	• P4-1 • L8-3 • L14-5sp • C6-2 • C9-3 • L12-4v (vet) • C9-4t (vet)	• C4-1 • P4-1c	• L10-5 • EV9-4	• P10-4	• L14-5W	• C8-3 (3D) • E9-3 (3D)	• C5-2

POGO-PIN Style:

Part Number	**86466-00** *(Pogo-Pin)*	**86469-00** *(Pogo-Pin)*	**86223-00** *(Pogo-Pin)*	**85796-00** *(Pogo-Pin)*	**86465-00** *(Pogo-Pin)*	*TBD* *(192 Ch.)*
Probe Types (where used)	• P10-4 • P4-1 • L8-3 • L14-5sp • C6-2 • C9-3 • L12-4v (vet) • C9-4t (vet)	• C4-1 • P4-1c • C10-3	• L10-5 • EV9-4	• P8-3 TEE	• C8-3 3D	• L14-5W

Required Tools/Equipment

- #3 Tip Phillips-head screwdriver

Overview of Procedure

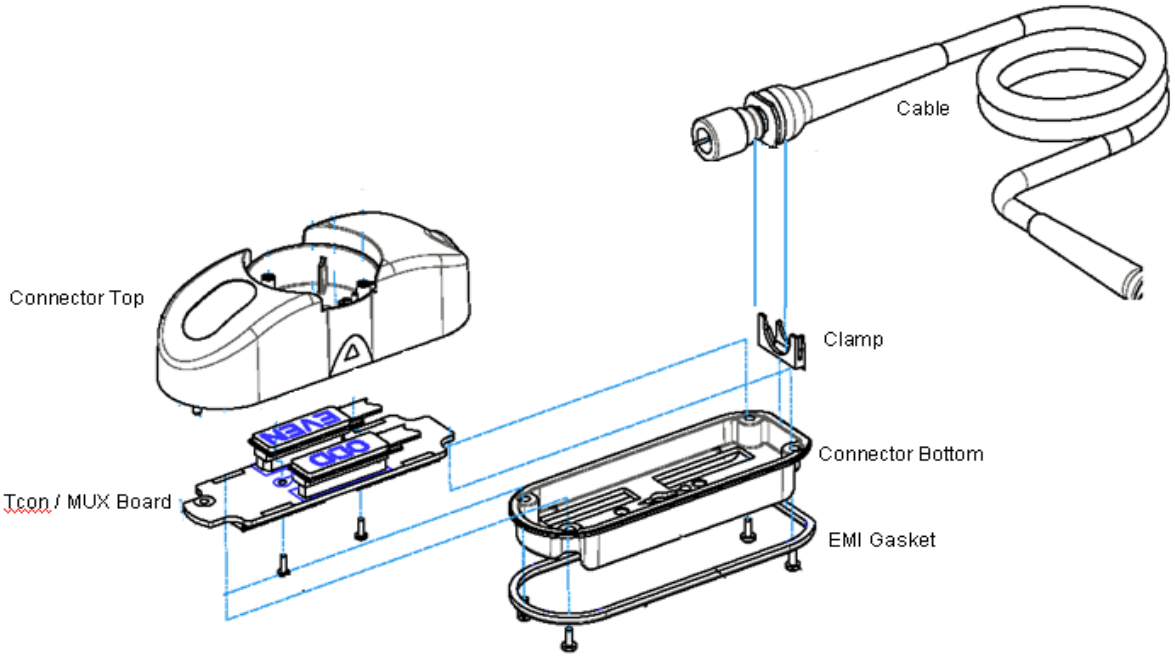
- Disassemble Connector Housing
- Remove TCON Board and Replace
- Reassemble and Verify Functionality

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Connector Disassembly:

STEPS:

1. Remove four Phillips-head screws that retain connector bottom to connector top housing
2. Remove connector bottom from housing
3. Remove two Phillips-head screws that retain T-CON/MUX board to housing
4. Disconnect MUX even and odd connectors from T-CON/MUX board
5. Remove old T-CON/MUX board



T-CON/MUX Board Installation – Connector Re-Assembly:

STEPS:

1. Connect MUX Even and Odd connector to mating sockets on replacement T-CON/MUX board
2. Position T-CON/MUX board over alignment pin and into position for mounting
3. Install two Phillips-head mounting screws, and tighten
4. Position plastic cable clamp into proper orientation (as shown in illustration)
5. Re-install connector bottom to connector top housing, and secure using four Phillips-head screws

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Verification:

STEPS:

1. Attach transducer to Z.ONE system and verify proper operation in all modes

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

20.7 Service Software Procedures

20.7.1 Accessing the "Diagnostics" Menu

The **Diagnostics** menu on the Z.ONE*Ultra* offers (or will offer in subsequent software/hardware releases) the following functionality:

BASIC Menu Functions:

- Displays the Z.ONE*Ultra* Scan Engine serial number
- Displays the currently installed system software level
- Displays the firmware revision level of major PC boards in the Scan Engine
- Configuration of the IP address, user name, and password for contact with Zonare FTP server
- Capturing, Exporting, and Sending of system log files

ADVANCED Menu Functions added: ***(ZONARE trained service personnel ONLY)***

- Bring up a System Console screen
- Advanced system firmware upgrades

The Diagnostic page can be accessed using one of the following two methods:

SERVICE Key- Quick Method:

1. Pressing the "**SERVICE**" key, on the upper row of the QWERTY keyboard on the SmartCart, will immediately bring up the main **User Diagnostic Panel** page.

NOTE

⚠

– *EXTENDED (>3 seconds) "**Serivce**"key press will initiate an immediate manual capture of system "LOG" files.*

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

Diagnostic Menu Path Method:

1. Using the "***Tab***" button and ***Menu Control*** on the Scan Engine (or SmartCart) user interface, advance to the "***Tools***" menu and then sequence through the following selection:

   Tools tab **--> System Setup --> Diagnostics**

2. Press the "SELECT" button on the user interface to access to the basic "**Diagnostic**" page

For detailed information on use of the "**Diagnostic Panel**" screen, refer to Section ***16.7*** of this manual.

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

21 PART NUMBER INFORMATION

21.1 SmartCart

21.1.1 Major FRU Assemblies

Number	Part Number	Description
1	85000-00	Z.ONE*Ultra* SmartCart, Top Level
2	85113-00	Display, 19” Flatscreen w/Overlay
3	85089-00	Assy, User Interface 1 (original), w/Trackball
4	85022-00	Assy, User Interface 1 (original), without Trackball
5	85808-xx*	Assy, User Interface 2 (update – w/Protocol key), w/Trackball
6	85800-xx*	Assy, User Interface 2 (update – w/Protocol key), w/o Trackball
7	86559-xx*	Assy, User Interface 3 (***Enhanced*** version), w/TB – Old OLED
8	86900-xx*	Assy, User Interface 3 (***Enhanced*** version), w/TB – New OLED
9	85095-00	Assy, OLED Display Board – Version 1 (for User Interface)
10	86901-00	Assy, OLED Display Board – Version 2 (for User Interface)
11	32854-00	Assy, QWERTY Keyboard (for User Interface)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

12	85026-00	Assy, Trackball Only (for Single SET version UI – Old)
13	86459-00	Assy, Trackball Only (for Dual SET version UI's - New)
14	85080-00	Assy, Main Board w/enclosure
15	85076-00	Assy, Scanner Deck w/Cables – *w/o MTP Option*
16	85118-00	Assy, Scanner Deck w/Cables – *with MTP Option*
17	85123-00	Assy, Bolster Plate, MTP Panel (w/o CW)
18	86121-00	Assy, Bolster Plate, MTP Panel - w/CW Module (Option)
19	85025-00	Assy, Power Supply Module (complete)
20	85039-00	Assy, Hard Disk, 80/120GB
21	86784-00	Assy, DVD Drive, complete, w/Adapter/cable (new-style USB)
22	85136-00	Assy, DVD Drive w/connector (old-style / IDE type)
23	85086-00	Display arm, w/cables
24	85031-00	Z-PAK Battery Pack Assy (Option)
25	86122-00	Assy, ECG Module (Option)

*xx::..... - 00 ENGLISH language overlay

..... - 03 GERMAN language overlay

21.1.2 Cables

Number	Part Number	Description
1	85029-00	Assy, Cable, Main Power, SmartCart
2	85044-00	Assy, Cable, Disk Drive Power, Main Bd J16 to Drives
3	85045-00	Assy, Cable, UI Power, Main Bd J2/J4 to UI

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

4	85078-00	Assy, Cable, USB, Main Bd. J29 to HD
5	33026-00	Assy, Cable, USB, Main Bd. J29 to Sony printer
6	32733-00	Assy, Cable, CAT-5, Main Bd. J23 to Pwr Module
7	32879-00	Assy, Cable, DVD ATAPI (Parallel), Main Bd. J15 to DVD
8	33877-00	Assy, Cable, DVD Adapter, USB->SATA/IDE, J29a to DVD
9	86117-00	Assy, Cable, DVD Drive Power
10	86471-00	Assy, Cable, DVD, USB-Style, Power/USB Combo *(new)*
11	85104-00	Assy, Cable, Dongle (MTP)
12	85116-00	Assy, Cable, Accessory +12V Power (MTP)
13	85051-00	Assy, Cable, CEE Signals (Scanner Deck)
14	85135-00	Assy, Cable, CW Power Patch, SmartCart
15	33522-00	Assy, Cable, CW to ECG, Power & Control
16	33592-00	Assy, Cable, ECG Patient 3-Lead
17	33524-00	Assy, Cable, ECG Trunk Cable to 3-Lead
18	33525-00	Pads, ECG (Set 4)

21.1.3 SmartCart Miscellaneous Items

Number	Part Number	Description
1	32865-00	Caster (wheel), 5 Inch, w/Directional/Brake Lock - (**Front**)
2	32867-00	Caster (wheel), 5 Inch, Full Swivel - (**Rear**)
3	32870-00	Gas Spring, SmartCart

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

21.2 *mini*Cart

21.2.1 *mini*Cart Major FRU Assemblies

Number	Part Number	Description
1	85002-00	z.one *mini*Cart, Top Level - 110VAC version
2	85002-10	z.one *mini*Cart, Top Level - 220VAC version
3	32629-00	Display, 13” Flatscreen, LCD (*mini*Cart)
4	32647-00	Keyboard, Remote (*mini*Cart)
5	32621-00	Assy, Main Power Supply
6	32640-00	USB Hub

21.2.2 *mini*Cart Cables

Number	Part Number	Description
1	32612-00	Assy, Cable, USB Gray, 1Meter
2	32613-00	Assy, Cable, USB Bulkhead (USB Remote Ports)
3	32614-00	Assy, Cable, Molded 3-Cable Harness (Scanner Docking)
4	85003-00	Assy, Cable, AC Power (USB Remote Printer)
5	85004-00	Assy, Cable, DC Power (*mini*Cart Display Monitor)
6	85007-00	Assy, Cable, DC Power (USB Hub)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

21.2.3 *mini*Cart Miscellaneous Items

Number	Part Number	Description
1	32737-00	Caster (Wheel), 5", Non-Locking (Rear)
2	32738-00	Caster (Wheel), 5", Brake Locking (Front)
3	31638	AC Power Cord, 15’ (North America)
4	31808	AC Power Cord, 4.5M (Continental Europe)
5	32618-00	Fuse, AC Main , Slo-Blo **6.3A** *(100-120V Systems)*
6	32627-00	Fuse, AC Main, Slo-Blo **3.15A** *(200-240V Systems)*
7	32619-00	AC Power Input Module
8	32620-00	AC Power Input Module Fuse Drawer
9	32656-00	Bracket, USB Printer Mounting (*mini*Cart)
10	32682-00	USB to Ethernet Adapter (***DICOM*** *Option*)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

21.3 Scan Engine

21.3.1 Major FRU Assemblies & Miscellaneous

Item	Part #	Description
1	82001-xx*	Assy, Complete, Scan Engine (Advanced Hardware)
2	80044-00	Battery Pack (1st –Gen, 4400 mAh version)
3	80269-00	Battery Pack (2nd-Gen, 38Wh version)

*xx::..... - 00 512MB Internal Archive Storage (baseline)

..... - 20 2GB Internal Archive Storage (upgrade option)

21.3.2 Scan Engine Accessories

Item	Part #	Description
1	80056	Battery Charger, 2-Bay - (w/o AC power cable)
2	31638	AC Power Cable (for Battery Charger) 120 VAC
3	31808	AC Power Cable (for Battery Charger) 220 VAC
4	Z316 (Sales #)	AC Power Adapter, AdvHdwe - (w/110 VAC Cable)
5	Z317 (Sales #)	AC Power Adapter, AdvHdwe - (w/220 VAC Cable)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

6	50001	Scan Engine Carrying Bag

21.3.3 Scan Engine Miscellaneous Items

Item	Part #	Description
1	80206	Stylus
2	31232	Feet, Rubber (3 used)
3	80068	Handle
4	31167	Cover, Trackball
5	80255-00	Rear Door Assembly (Zonare)
6	32666-00	256MB, USB Memory Stick
7	32669-00	2GB, USB Memory Stick

21.4 Scan Module

21.4.1 Major FRU Assemblies & Miscellaneous

Item	Part #	Description
1	82001M-xx*	Assy, Complete, Scan Module

*xx::..... - 00 512MB Internal Archive Storage (baseline)

..... - 20 2GB Internal Archive Storage (upgrade option)

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

21.5 Transducers

21.5.1 Transducers (Complete Assemblies)

Item	Part # *(Sales) : Service*	Description	
1	(Z101) : 84001-00	C5-2 - Convex Array	
2	(Z103) : 84002-00	EV9-4 – Endo Vaginal	
3	(Z102) : 84003-00	L10-5 - Linear Array	
4	(Z108) : 84004-00	P4-1c - Phased Array	
5	(Z104) : 84005-00	P4-1 - Phased Array	
6	(Z105) : 84006-00	P10-4 - Phased Array	
7	(Z106) : 84007-00	L8-3 - Linear Array	
8	(Z107) : 84008-00	L14-5sp - Linear Array	
9	(Z111) : 84009-00	C6-2 - Convex Array	
10	(Z109) : 85795-00	C9-3 - Convex Array	

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

11	(Z116-00) : 86000-00	A2CW – CW Doppler	
12	(Z118-00) : 86111-00	A5CW – CW Doppler	
13	(Z119-00) : 86333-00	C4-1 – Convex Array	
14	(Z114-00) : 86444-00	C9-4t – Specialty	
15	(Z117-00) : 85999-00	C8-3_{3D} – 3D Imaging	
16	(Z110-00) : 85333-00	LV14-5w - WALA	
17	(Z121-00) : 86555-00	LV12-4V - Veterinary	
18	(Z115-00) : 85888-00	P8-3 TEE - TransEsophageal	
19	(Z124-00) : 86889-00	C10-3	
20	(Z123-00) : 85666-00	E9-3_{3D} -3D Imaging	TBS

21.5.2 Transducers Accessories

Item	Part #	Description

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

1	Z153	Biopsy Kit, 16 gauge
2	Z154	Biopsy Kit, 18 gauge
3	Z155	Biopsy Kit, 22 gauge

21.6 Peripherals

Item	Part #	Description	
1	(Z409-00) : 40005-00	SONY, UP-D897, USB (Digital) B/W Printer	
2	(Z415-00) : 40008-00	SONY, UP-D23MD, USB (Digital) Color Printer	
3	(Z416-00) : 40012-00	SONY, UP-D25MD, USB (Digital) Color Printer	
4	(Z336-00) : 33064-00	2-Pedal Footswitch	
5	85105-00	Audio Video Extension Device (AVED) Box	
6	(Z345-00) : 85787-00	Audio Video Extension Device (AVED) w/Kit	
7	(Z373-00) : 40011-00	Barcode Reader	

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

22 INDEX

A

AC Distribution, 130
AC Power Adapter, 70, 71
AC Power Board, 246
Audio-Video, 78, 79
AVED – Audio Video Extension Device, 138

B

Battery Charger, 2-Bay, 71
Block Diagram – Power Module (Basic), 125
Block diagram, overall system, 132, 133
Block Diagram, Power Module (Detailed), 126
B-Mode, 55
brake, 63

C

C5-2 Convex, 22, 23, 24, 293, 294
Cable adjustment, Lift Release, 183, 185, 233
Cables, Part Number, 287, 288, 289
Calibration, 182
Caster/Wheel (miniCart), 278
Caster/Wheel (SmartCart), 210
Cleaning, 176, 177, 178, 179, 182
CW Module, 258

D

Date-Time, 78, 79
Definitions, acronyms, 13, 15
Diagnostic Panel Operations, 167
Diagnostics, 284
DICOM Configuration, 82, 85, 90, 94, 95, 102, 110, 111, 113, 115
DICOM" Worklist, 109
Disinfecting, 179
Display Adjustment (miniCart), 188
Display, 19, 212, 216
Door Assembly, *280*, *292*
DVD/CD Burner, 137

E

ECG Module, 260
Error Messages, 206
EV9-4 Transvaginal, 24, 25

F

Fans, Scan Engine, 207
Features, system, 118
FRU Assemblies, *286*, *289*, *291*, *292*
FTP Site, 167
Function Keys, 198
Fuse Replacement, 270

G

Gas spring, 263
Grayscale test, 164, 167, 168, 171, 173, 174, 175, 186, 187, 188, 189, 284, 285

H

Height, 20
Height adjuster, 122

I

Idle Mode, 115
Immersion Method, 179
Installing, USB Memory Stick, 117
Institution, 75, 80

K

Keyboard functions, (Detailed), 53
Keyboard Layout, 52

L

L10-5 Linear, 23, 24, 35
Labeling, product, 30
LED Definitions, 199, 207
Lithium-Ion Battery, 36, 66

M

Main Board Assy, 12, 120
miniCart Power Supply, 12
M-Mode, 13, 44, 48, 56

N

Network store, DICOM, 107, 108

P

Part Number, *286*
Peripherals, 137, 157
Power Module Assy, 120
Power Supply Module, 135, 140
Power Supply Replacement (miniCart), 271
Powering-OFF, 68
Powering-ON, 67
Print-Store, DICOM, 84
Procedures, service, 182
PW, 13, 14, 44, 48, 56, 57, 118

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"

R

Rear I/O, 58, 59
Remote (Internet) Software Upgrade, 175
Remote Keyboard (*mini*Cart), 274

S

SAFETY, 17
Scan Engine Rear I/O, 59
Scanner Deck Assy, 120
Service Software Procedures, 284
Shipping, 61
Software Upgrade, 157, 159, 162, 167
Sony UP-21MD Install, 150
SONY UP-D897 Install, 144
Specifications, 20
Status LEDs - Power Supply, 203

T

Tools, Listing, 210
Touchscreen calibration, 186
Transducers, *22*, *35*, *178*, *293*
Transducers, Cleaning-Care, *178*
Troubleshooting, *190*, 192, *203*

U

UI Controls, detailed (Scan Engine), 55
UI Controls, detailed (SmartCart), 43, 48
USB Hub Replacement, 273
USB Memory Stick, 11, 117, 280, 292
User Interface Assy, 121
User Interface, Replacement, 237, 240

"Note: Copies are uncontrolled documents - For revision verification see the Master Documentation List"